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CONNECTICUT AGRICULTURAL EXPERIMENT STATION

NEW HAVEN, CONN.

BULLETIN 141, JANUARY, 1903.

Commercial Feeding Stuffs in the Connecticut Market.

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The Bulletins of this Station are mailed free to all citizens of Connecticut who apply for them, and to others as far as the limited editions permit.

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THE COMPOSITION OF THE COMMERCIAL FEED- ING STUFFS AT PRESENT SOLD IN CONNEC- TICUT.*

During the month of October, 1902, Mr. Churchill, sampling agent of this Station, collected three hundred and five samples of commercial feeding stuffs, mostly in the hands of dealers, in forty-nine towns and villages of this State.

The analyses of these feeds and of a few others sent by purchasers appear in Table IV, pages 26-57.

This table shows:

1. The chemical analysis of each sample, determined, as required by statute, by the methods adopted by the American Association of Official Agricultural Chemists.

2. The average composition of each feed as determined by the analyses.

3. The percentages of digestible nutrients in the feeds. These are calculated by the digestion coefficients, compiled by Dr. Jordan, and printed in Bulletin 77 of the Office of Experiment Stations. The coefficients, so far as they apply to the feeds discussed in this report, are given in Table I, page 20.

On following pages the analyses are discussed in the order of their place in Table IV.

COTTON SEED MEAL.

Analyses on pages 26-27.

The percentages of protein in the eight samples which were completely analyzed ranged from 39.87 to 45.37, the average being 42.96. Two samples having less protein than the others, Nos. 7605 and 7660, contained larger percentages of fiber, indicating a less satisfactory separation of hulls.

The cotton seed oil producers prescribe that either "choice" or "prime" cotton seed meal shall contain not less than eight per cent. of ammonia; which is equivalent to 41.12 per cent. of protein. The two samples above mentioned are, therefore, on this basis, neither "choice" nor "prime" meal.

* The microscopic work in connection with the analyses reported in this paper was wholly done by Mr. Winton; the chemical analyses were made by Messrs. Ogden, Silverman and Bailey; the results were prepared for publication by the director.

The average percentages of protein and fat, as determined at this Station, and the average prices, at the time the samples were drawn, have been as follows for the last four years:

	1899	1900	1901	1902
No. of Samples	10	4	6	8
Percentage of Protein.....	46.4	43.9	44.4	43.0*
" " Fat.....	10.4	8.6	9.8	10.3
Average price.....	\$24.00	27.00	28.80	29.70

The price of cotton seed meal has steadily risen in the last four years, and the average percentage of protein has on the whole declined.

Guaranties.

Three of the samples were reported without the guaranty required by law: Nos. 7665, 9749 and 4604. 7605 was guaranteed to contain "7½ per cent. of ammonia," which is equivalent to 38.6 per cent. of protein. The sample contained 40.5 per cent. All the other samples had a guaranty of 43 per cent. of protein and 9 of fat. The only sample which failed to substantially meet this guaranty was 7660, which contained 3 per cent. less of protein and somewhat less of fat.

LINSEED MEAL.

Analyses on pages 26-27.

"Linseed Meal," "Oil Meal," and "Flax Seed Meal" are trade names for ground flax seed from which more or less of the oil has been removed. By the "old process" the oil is partly removed by pressure, leaving, however, from 5 to 10 per cent. of oil, "fat," in the meal. By the "new process" the oil is so far extracted with benzine as to leave less than two and a half per cent. in the meal. New process meal is more uniform in composition and contains more protein than old process meal. All the samples of each kind analyzed this year have been of good quality and unadulterated. The average percentages of protein and fat found in linseed meal for the last four years, as determined at this Station, with the average prices at the time the samples were drawn, are as follows:

* 43.7 including 4 other partial analyses.

	New Process.				Old Process.			
	1899	1900	1901	1902	1899	1900	1901	1902
No. of Samples.....	4	2	3	4	8	3	4	6
Percentage of Protein	37.7	38.4	39.0	39.8	33.8	31.3	34.4	32.8
" " Fat ---	2.4	2.4	1.8	2.1	7.7	6.7	7.7	7.8
Average price	\$28.10	32.50	30.00	31.00	29.00	31.00	30.50	32.00

Guaranties.

Thirty-eight per cent. of protein and 3 per cent. of fat is the guaranty on all the samples of new process linseed meal, whose analyses are given in Table IV, and all meet this guaranty as respects protein. None of them have 3 per cent. of fat determined by the method prescribed by the Association of Official Chemists.

Of the old process meals, Nos. 7651, 7606, and 7562, meet the guaranty of 32 per cent. protein and 5 of fat. 7613 has a guaranty of 34 per cent. protein and 6.30 of fat. The protein found is $2\frac{1}{2}$ per cent. below guaranty. 7471 has a guaranty of 37.8 per cent. protein and 7.5 of fat. The protein found is 2.8 per cent. less than the guaranty. No guaranty was given with No. 7693.

WHEAT PRODUCTS.

These are by-products in the manufacture of wheat flour. Several different processes of milling are in common use, yielding by-products which are not entirely alike in composition. The products made from winter wheat also differ in composition from those from spring wheat.

Wheat Bran consists of the outer layers of the wheat berry, which are dark in color and do not easily pulverize.

Wheat Middlings, as found in the feed market, consist of inner layers of the covering of the berry, which are lighter in color and more easily pulverized than bran, and of other parts from which fine white flour cannot be made.

Red Dog Flour is the poorest grade of flour; off color and often sold as a cattle food.

Many mills do not sell bran and middlings separately, but run them together, often with other waste wheat products, and sell the mixture as "Mixed Feed."

With a single exception the samples of wheat feed were not accompanied, as is required by law, with any statements of composition.

In Table IV the wheat products from the mills named below are classed as winter wheat.

Acme Milling Co., Indianapolis, Ind.	McDaniel & Pitman Co., Franklin, Ind.
American Cereal Co., Chicago.	Meyer, J. T., & Co., Clinton, Mo.
Blish Milling Co., Seymour, Ind.	Miles & Son, Frankfort, Ky.
Camp Spring Mill Co., St. Louis, Mo.	Model Roller Mills, Nashville, Tenn.
Cole, H. C., Milling Co., Chester, Ill.	Moore, R. P., Milling Co., Princeton, Ind.
Dow & King, Pittsfield, Ill.	Rex Milling Co., Kansas City, Mo.
Eldred Mill Co., Jackson, Mich.	Saginaw Milling Co., Saginaw, Mich.
Evans, Geo. F., Hoosier Mills, Indianapolis, Ind.	Saint Jacob Enterprise Mill Co., St. Louis.
Hannibal Milling Co., Hannibal, Mo.	Scott's Flour Mills, Detroit, Mich.
Harter, Isaac, & Co., Galena, O.	Sparks Milling Co., Alton, Ill.
Hecker-Jones-Jewell Milling Co., N. Y.	Stock, F. W., Hillsdale, Mich.
Holly Milling Co.	Taylor Bros. Milling Co., Quincy, Ill.
Hunter Bros., St. Louis.	Valiers & Spier Mill Co., Marine, Ill.
J. E. M. Mill Co., Frankfort, Ky.	Valley City Milling Co., Grand Rapids, Mich.
Jenks, J., & Co., Sand Beach, Mich.	Voigt Milling Co., Grand Rapids, Mich.
Kane Mill Co., Atchison, Kansas.	Wabash Mills, Terre Haute, Ind.
Kehlor Bros., St. Louis, Mo.	Walsh De Roo Milling Co., Holland, Mich.
Lawrenceburg Roller Mills Co., "Snowflake," Lawrenceburg, Ind.	Washington Flour Mill Co., Washington, Mo.
Lexington Roller Mill Co., Lexington, Ky.	
Maumee Valley Milling Co., Defiance, Ohio.	

The wheat products from the following mills are classed as from spring wheat.

Anchor Milling Co., Superior, Wis.	Minkota Milling Co., Superior, Wis.
Andrews & Co., Minneapolis.	Moseley & Motley Milling Co., Rochester, N. Y.
Banner Milling Co., Buffalo, N. Y.	New Prague Milling Co., New Prague, Minn.
Bay State Milling Co., Winona, Wis.	New York City Mill Co.
Berger, Anderson Co., Milwaukee.	North Dakota Milling Association, No. Dakota.
Brayton Milling Co., Minneapolis.	North Western Consolidated Milling Co., Minneapolis.
Cataract City Mill Co., Niagara Falls, N. Y.	Pillsbury-Washburn Co., Minneapolis.
Central Valley Milling Co., Buffalo, N. Y.	Red Lake Falls Milling Co., Red Lake, Minn.
Daisy Roller Mill Co., Milwaukee, Wis.	Russell & Miller Milling Co., Superior, Wis., and Valley City, No. Dakota.
Davis Co., J. G.	Sheffield Milling Co., Faribault, Minn.
Duluth Imperial Mill Co., Duluth.	Star & Crescent Milling Co., Chicago.
Freemen Milling Co., Superior, Wis.	Thornton & Chase, Buffalo, N. Y.
Gardner Mill, Hastings, Minn.	Urban Roller Milling Co., Buffalo, N. Y.
Grafton Roller Mills, Grafton, N. D.	Washburn-Crosby Co., Minneapolis.
Imperial Mill Co., Duluth, Minn.	Whitney & Wilson, Rochester, N. Y.
H. H. King & Co., Minneapolis.	Woodworth & Co., E. S., Minneapolis.
Lake Superior Mills, Superior, Wis.	
Listman, Wm., Milling Co., Superior, Wis., and Lacrosse, Wis.	
Miner-Hillard Milling Co., Wilkes Barre, Penn.	

Bran from Winter Wheat.

Analyses on pages 28-29.

The eleven samples whose analyses appear in the table were of good quality and not found in any instance adulterated. The percentages of protein ranged from 15.94 to 18.19.

Bran from Spring Wheat.

Analyses on pages 28-31.

The nineteen samples examined were of good quality and none of them were found adulterated. The percentage of protein ranged from 14.87 to 18.06, the average being a little lower than in winter wheat bran.

Middlings.

Analyses on pages 30-33.

The samples, with a single exception, were of the usual composition and not found adulterated. Middlings from spring wheat contained on the average a per cent. more of protein than winter wheat middlings.

Sample 7466 is marked "Colonial Middlings," and stated to be made by the Miner, Hillard Milling Co., Wilkesbarre, Penn. It is not wheat middlings, but a mixture of a wheat product and of corn meal, and contains about 1.8 per cent. more of fat and 6 per cent. less of protein than spring wheat middlings. It is sold with a guaranty of 13.5 per cent. of protein, 6.8 of fat and 62.5 of extract. The protein found is half a per cent. less, and the extract nearly $2\frac{1}{2}$ per cent. less than the guaranty.

Mixed Feed.

Analyses on pages 34-39.

In the tables are analyses of 34 samples of mixed feed from winter wheat, 17 from spring wheat and 3 which are unclassified. All of these feeds are of good quality. The winter and spring wheat mixed feeds have substantially the same percentage of protein. The only one with a guaranty of composition is the Buckeye Wheat Feed, made by the American Cereal Co. 17.75 per cent. of protein and 4.70 per cent. of fat are guaranteed. Two samples were found to contain 16.87 and 17.75 per cent. of protein and 4.54 and 4.57 per cent. of fat respectively.

Adulterated Mixed Feed.

Seven samples sold as mixed feed are found to contain either corn bran or ground corn-cobs in quantity sufficient to seriously reduce their feeding value. Under the food law of this State such mixtures are adulterated and their sale is illegal. "Mixed Feed" is a trade name in common use, meaning a pure wheat-feed made up of mixed by-products separated in the flour milling process. Such mixed feed, as our analyses show, has a tolerably uniform composition, the protein ranging this year from 16.31 to 19.00 per cent., and the average cost being \$22.10 per ton.

The mixture of wheat products with corn-cob or corn bran, above referred to, is a fraud, when sold under the name of another article, which it closely resembles in appearance, but to which it is quite inferior as a feed, the protein ranging from 9.31 to 14.75 per cent., while the price charged is practically the same as that of the mixed feed which it imitates.

Mixed Feed Adulterated with Corn Bran.

Nos. 7667 and 9761, were sold as "mixed feed" by Johnson & Morrison, Bethel, who state that the feed was bought of Hollister, Chase & Co., 90 Broad St., New York.

Messrs. Hollister, Chase & Co., state that the car was bought by them of Bernet, Craft & Kauffman, St. Louis, Mo.

Both samples, as appears from the microscopic and chemical examinations, are adulterated with enough corn bran to seriously reduce their feeding value.

Mixed Feed Adulterated with Corn Cobs.

7518. "Jersey Mixed Feed." Sampled from stock of Young Bros. Co., bought by them from Hollister, Chase & Co. of 90 Broad St., New York City. The bags containing the feed were marked, Kentucky Milling Co., Henderson, Ky., and Hollister, Chase & Co. state that it was bought of this firm.

7589. "Dairy Winter Mixed Feed." Sampled from stock of G. W. Eaton, Bristol, sold by Henry Jennings, 407 Chamber of Commerce, Boston, Mass., who states that it was bought

of a Portland firm, and as there are several mills in Henderson, Ky., the goods are invoiced without the name of the shippers.

7596. "Winter Mixed Feed." From stock of W. O. Goodsell, Bristol, bought of The Strong Lefferts Co., New York City. We are unable by correspondence with this firm to trace the goods any further.

7690. "Winter Mixed Feed." From stock of Balch & Platt, Winsted, bought of the J. S. Wolf Co., Pittsfield, Mass., which firm has not replied to inquiries concerning it.

4594. "Eclipse Mixed Feed." Sent by Miss M. A. Neale, Southington, from stock bought of Geo. W. Eaton, Plainville.

All the above feeds are adulterated with ground corn-cobs. Their analyses follow:

ANALYSES OF ADULTERATED MIXED FEEDS.

	Bernet, Craft & Kauffman St. Louis.	Kentucky Milling Co. Henderson, Ky.	Henry Jennings. From Henderson, Ky.	Strong Lefferts Co.	J. S. Wolf Co.	G. W. Eaton.	Mixed Feed. Genuine.*
	7667	9761	7518	7589	7596	7690	4594
Water	10.46	11.50	10.84	10.31	10.32	10.46	11.29
Ash	5.94	5.46	4.80	4.38	4.25	4.23	5.36
Protein	14.37	13.62	12.81	14.75	13.12	14.12	17.69
Fiber	7.70	9.47	15.01	12.17	15.90	14.89	7.66
Extract	56.04	53.61	52.89	54.30	53.24	53.01	53.28
Fat	5.49	6.34	3.65	4.09	3.17	3.29	4.72
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Cost per ton	\$20.00	21.00	21.00	23.00	22.00	23.00	22.10

These analyses show the deficiency in protein, and the excess of woody fiber which characterize these spurious "mixed feeds."

It seems quite impossible to learn anything by correspondence, regarding the manufacturers of them.

Last year the "Eclipse Mixed Feed" was traced to the W. R. Mumford Co. of Chicago, who did not notice letters of inquiry regarding the manufacturer of this brand.

It is quite possible that the retail dealers did not know the spurious nature of these adulterated feeds.

* Average of the 51 analyses made in 1902.

Wholesalers also may sometimes be deceived, but their opportunities for learning the character of the feed they sell are much better, for the mills which produce this stuff are well known in the trade.

The law regarding feeds requires that wheat feeds shall be sold with a statement giving name and address of the manufacturer and the guaranteed composition. The law is disregarded by dealers and the excuse is made that the enforcement of the law would cause great annoyance in the trade, and is unnecessary because wheat feeds are always pure and uniform in composition.

The fact is that for the two years past wheat feeds have been almost the only adulterated feeds in our market. Naturally wheat feed itself is brought into some disrepute and dealers who sell adulterated articles, whether innocently or not, come to be regarded with suspicion.

Average Composition of the Various Pure Wheat Products.

The average composition of the various pure wheat feeds sold in Connecticut in the last three years, with their prices, are given in the following table:

AVERAGE COMPOSITION AND PRICE OF WHEAT FEEDS IN CONNECTICUT IN 1899, 1900, 1901 AND 1902.

1899	Bran.		Middlings.		Mixed Feed.	
	Winter.	Spring.	Winter.	Spring.	Winter.	Spring.
Protein	15.9	15.6	15.8	15.6	16.8	16.8
Fat	4.3	4.7	4.4	4.7	4.5	5.1
Ton price.....	\$19.80	19.14	19.00	19.25	19.44	19.25
1900						
Protein	16.1	16.5	17.7	19.1	18.1	17.6
Fat	4.6	5.0	4.7	5.5	4.7	5.3
Ton price.....	\$21.09	20.00	21.00	21.50	21.00	20.80
1901						
Protein	16.3	17.3	18.0	19.7	17.5	18.5
Fat	4.5	4.7	5.0	5.5	4.7	5.1
Ton price.....	\$21.80	21.06	22.75	22.10	22.20	22.20
1902						
Protein	17.1	16.7	18.1	19.2	17.7	17.7
Fat	4.6	4.9	4.4	5.4	4.6	5.1
Ton price.....	\$23.37	20.90	23.85	23.44	22.00	22.35

This table indicates that:

1. The spring wheat products, as a rule, have somewhat higher percentages, both of protein and fat, than the winter wheat products.
2. This difference is rather more pronounced and constant in the case of middlings than in that of either bran or mixed feed.
3. The percentages of protein and of fat in bran are rather lower than in either middlings or mixed feed.
4. On the average the winter wheat products sell at a slightly higher price than the spring wheat products.

MAIZE MEAL.

Analyses on pages 38-41.

In Table IV are analyses of forty-eight samples drawn by our agent in all parts of the State.

All of these samples, judging from their water-content, are ground from old corn, not of the crop of 1902. The percentages of protein range from 9.19 to 11, averaging 9.89, and there is no evidence of adulteration in any of them, the range of composition being no greater than is usual in pure maize meal. The only sample calling for special notice is 7307, made by the American Cereal Co. and branded "Buckeye Pure Gold."

This has lower percentages of protein, fiber and fat than any other sample. Possibly it represents corn from which the germ has been removed. Apparently no foreign matter is mixed with it.

Guaranties.

None of the samples had any guaranty of composition.

GLUTEN MEAL.

Analyses on pages 40-43.

Five brands of gluten meal have been found on the market and their analyses appear in Table IV. The names of these brands, their guaranties and also their average composition, as appears from our analyses, are as follows:

No. of Analyses.		Protein.	Fat.
1	Pope's Cream Gluten, guaranteed	34.12	3.20
	found.....	43.00	1.48
2	Atlas Gluten, guaranteed	36.00	14.00
	found	36.28	15.51
3	Chicago Gluten, guaranteed.....	38.00	3.00
	found.....	35.46	2.82
1	King Gluten, guaranteed.....	35.5	3.7
	found.....	33.75	2.04
2	Atlantic Gluten, guaranteed.....	39.00	2.0
	found	46.22	2.44

The single sample of "Pope's Gluten" contained 9 per cent. more of protein and 1.75 per cent. less of fat than is guaranteed, differences so great as to suggest that the meal was in a package wrongly tagged. This brand was found last year to contain about 34.5 per cent. of protein and 1.34 of fat.

"Atlas gluten" is here included because of its trade name. It is, however, totally different in appearance and quality from the gluten meals obtained from corn meal in the glucose manufacture. It appears to contain dried brewery or distillery products. The composition fully meets the guaranty. It contains about the same percentage of protein as the gluten meals with four or five times as much fat.

The guaranty of Chicago gluten is stated to refer to the *water-free meal*. On this basis the samples analyzed contain an average of 39.6 per cent. of protein and 3.1 per cent. of fat, which meets the guaranty, although the meal with the usual water content contains only 35.46 per cent. of protein and 3.1 per cent. of fat. To the feeder it is of no great importance to know what the feed would contain if there were no moisture in it, but it is of great importance to know what it contains as he finds it in market. There is no good reason why this information should not be given in the guaranty. A guaranty which does not give it is of no practical use to the purchaser.

The analysis of the single sample of King gluten is slightly below the guaranty as respects protein and fat.

One sample of Atlantic gluten, "extra strong," made at Westport, Conn., contains 68.88 per cent. of protein, the highest percentage of protein which we have ever met with in the feed market. This brand is not very uniform in composition, the percentages of protein in three other samples analyzed

being 43.6, 48.9 and 52.9. It fully meets the manufacturer's guaranty. In all the samples examined this year small amounts of rice hulls have been found. Atlantic gluten is made from wheat.

GLUTEN FEED.

Analyses on pages 42-45.

Fifteen analyses of this material are given in Table IV, representing five distinct brands.

Their guaranties compared with their composition are as follows:—

No. of Analyses.		Protein.	Fat.
7	Buffalo Gluten Feed, guaranteed ---	27.5	3.3
	found -----	27.2	3.2
3	Globe Gluten Feed, guaranteed ----	27.5	3.3
	found -----	26.5	3.5
2	Pekin Gluten Feed, guaranteed ----	27.5	3.3
	found -----	26.9	3.4
2	Queen Gluten Feed, guaranteed ----	27.1	3.2
	found -----	24.5	2.1
1	Waukegan Gluten Feed, guaranteed	27.3	3.3
	found -----	25.1	3.5

The analyses of Queen gluten and Waukegan gluten do not meet the manufacturers' guaranties in respect to protein. The analyses of the other brands are in substantial agreement.

HOMINY CHOPS, HOMINY MEAL, HOMINY FEED.

Analyses on pages 44-47.

Of the 28 samples represented in Table IV, two are inferior; 7515, Keystone Fancy, sold by Fish & Co., N. Y., and No. 7462, sold by Narragansett Milling Co. E. Providence, R. I. They are deficient in protein and fat and contain twice as much fiber as the others. Apparently these deficiencies are due to an undue proportion of hulls. There is no indication of admixture with foreign matters. With these two exceptions the samples are all of good quality, the percentage of protein ranging from 10.87 to 12.50 and averaging 11.57 per cent.

Guaranties.

Few of the lots of hominy meal examined by our sampling agent had any guaranty, as required by the law concerning feeds.

Those made by Hunter Bros. of St. Louis, Mo., and by Suffern, Hunt & Co., Decatur, Ill., had a guaranty of 11 per cent. protein and 7.7 of fat. The Buffalo Cereal Co. guarantee 11 of protein and 8.5 of fat. Chapin & Co., of St. Louis, guarantee 11.0 of protein and 8.0 of fat, and C. W. Campbell & Co., Westerly, R. I., 9.0 per cent. of protein and 6.0 per cent. of fat. The goods made by the firms named were fully up to these guaranties.

RYE BRAN AND RYE FEED.

Analyses on pages 46-47.

The six samples analyzed had the usual composition, the average percentage of protein being 15.43, ranging from 14.94 to 16.19.

None of the samples were accompanied by a manufacturers' guaranty as is required by law.

BARLEY PRODUCTS.

Malt Sprouts.

Analyses on pages 46-47.

The two samples examined have about the usual composition, 27.7 per cent. of protein and 1.3 of fat. No. 7308 had a guaranty of 22 per cent. of protein. Both samples contained considerable black bind weed, one of them, 7308, cockle, and the other wild mustard and linseed; all being weeds likely to be found in barley.

Dried Brewers Grains.

Analyses on pages 48-49.

This feed, comparatively new in this State, contained,—the average of two analyses,—29.7 per cent. of protein and 6.9 per cent. of fat. As a source of digestible protein it ranks with the gluten feeds.

OAT PRODUCTS.

Ground Oats.

Analyses on pages 48-49.

Four samples of ground oats had the average composition, 12.95 per cent. of protein and 4.54 of fat.

Royal Oat Feed.

Analyses on pages 48-49.

A single sample, 7671, made by the Great Western Cereal Co., consists largely of oat hulls, as is shown both by microscopic examination and by chemical analysis. Eight and one fourth per cent. of protein is guaranteed and only 6.87 per cent. is found in it. The guaranty of fat is 4.14 per cent. and 1.95 per cent. is found.

BUCKWHEAT PRODUCTS.

Analyses on pages 48-49.

The middlings, made by the Quinnebaug Mill of Danielson, have the usual composition, containing over 28 per cent. of protein. The hulls, as the analysis shows, are of little or no feeding value.

MISCELLANEOUS BY-PRODUCTS.

Analyses on pages 48-49.

Here are included several kinds of manufacturing refuse, some of them having value as feeds, others quite worthless; a sort of dairymen's "bargain counter."

One sample of Peanut Bran contains 10.50 per cent. of protein along with 43 per cent. of fiber and 10.00 per cent. of mineral matter, of which 6.2 per cent. is sand.

One sample of Broken Peanuts contains 22.94 per cent. of protein; more, that is, than the wheat feeds, with 32.37 per cent. of oil. Its richness in protein suggests its value as a feed. What effect the oil in such large proportion would have on dairy products is a question which cannot be answered except by experiment.

Dried Distiller's Grains containing 34.50 per cent. of protein have a high value as dairy feed. The cost is also high, \$34.10 per ton in car lots, delivered in New Haven.

"Cornaline" consists of coffee hulls, of no value as a feed and used as an adulterant of feeding stuffs.

Gee's Germ Middlings, made by G. E. Gee Grain Co., Minneapolis, Minn., is a mixture of ground weed seeds such as are common in screenings; black bind weed, yellow and green fox-tail grass, a little linseed, etc. The chemical composition of

these middlings is approximately like that of wheat middlings, but it is extremely doubtful if it has anything like the same feeding value.

"Seed Meal" is a poultry food prepared from wheat screenings by grinding. It contains more protein than Gee's middlings just noticed, but belongs in the same class.

"Ready Bits" (damaged) is one of the cereal breakfast foods.

The "Corn Feed" sent by Vine Hill Farm Co. is made up of corn bran, chaff from cobs, immature corn kernels, oats, etc.

"White Meal" is hominy meal or some similar product mixed with salt, of which the sample contains 1.85 per cent.

MISCELLANEOUS MIXED FEEDS.

Provender and Other Corn and Oat Feeds.

Analyses on pages 50-53.

All of the 17 samples of Provender are of good quality, the percentage of protein ranging from 10.00 to 11.19 and averaging 10.47 per cent. None of the samples was accompanied by a guaranty of composition.

With the composition of this standard mixture, which should contain equal parts of corn and oats, are compared in the following table the average composition of various other corn and oat feeds on the Connecticut market.

	Protein.	Fiber.	Nitrogen-free Extract.	Fat.	Ton price.
Provender	10.47	3.95	67.10	4.13	\$30.30
Victor Corn and Oat Feed.....	9.21	11.38	61.33	4.09	24.00
Vim Oat Feed.....	8.25	23.27	51.17	3.10	18.00
Boss Corn and Oat Feed	8.01	14.12	59.51	2.75	24.00
Excelsior " "	9.37	12.40	58.62	4.53	20.00
De-Fi " "	9.25	15.30	58.77	3.19	22.00
Diamond Mills Corn and Oat Feed	8.81	10.43	62.05	5.54	26.00

Each brand of these corn and oat feeds has a guaranty of composition which corresponds with the composition of the articles as determined by our analysis except in the following cases: The Boss Corn and Oat Feed does not meet the guaranty in respect of fat—4.2 guaranteed, 2.75 found—and the Diamond Mills brand, in which 9.44 per cent. of protein and 4.78 of fat are guaranteed, does not meet this guaranty.

As far as known to us, a single digestion experiment has been made with Victor Corn and Oat Feed. The digestible nutrients of provender and all the other corn and oat feeds have been calculated in Table IV by the digestion coefficients which were determined in the single test made on one brand. This, of course, involves the assumption that all are about equally digestible, and the figures therefore represent their average digestibility only in the most general and uncertain way.

CORN, OATS AND BARLEY.

Analyses on pages 52-53.

In the table are analyses of five samples of "Schumacher's Stock Feed," also called Schumacher's Corn, Oats and Barley. The material is a mixture of the grains named and shows in these analyses a uniform composition. The guaranty is 13 per cent. of protein and 5 of fat. The average of the five samples shows 12.66 of protein and 5.13 per cent. of fat.

HORSE FEEDS.

Two brands appear in the tables, pages 52 and 53, the one made by the H. O. Co., the other by the Buffalo Cereal Co, both of Buffalo, N. Y. Both feeds are made of corn, oat, and wheat products, have about the same composition, sell at the same price, and meet the manufacturers' guaranty.

POULTRY FEEDS.

Analyses on pages 52-55.

The H. O. Poultry Feed contains a wheat product, corn meal and oats without hulls; the H. O. Scratching Feed consists of cracked corn, whole wheat, whole oats, with some cockle, chess and bind weed seed; the Success Poultry Feed consists of wheat, corn meal, oats and linseed; and the American Poultry Feed, made by the American Cereal Co., contains corn and a wheat product.

In chemical composition these feeds substantially meet the manufacturers' guaranties. They cost from \$30.00 to \$38.00 per ton.

BONE AND MEAT MEAL.

Of this material, chiefly used as poultry food, six brands were found and analyzed, as appears on pages 54 and 55. The compo-

sition depends wholly on the amount of bone present, and most of the "ash" in the analyses consists of bone phosphate.

The composition of several of these brands does not at all correspond with the manufacturers' guaranty, and this is hardly to be expected with material so coarse and heterogeneous as this.

PROPRIETARY DAIRY AND STOCK FEEDS.

Analyses on pages 54-57.

The Quaker Dairy Feed is a mixture of oat, wheat and corn products and fully meets the manufacturer's guaranty.

The H. O. Dairy Feed is a mixture of oat, wheat and corn products with some cotton seed meal, and in composition meets substantially the guaranty.

The Great Western Dairy Feed consists chiefly of an oat product containing much hulls, as shown by the percentage of fiber, 20.83 per cent. One sample contains a little corn gluten. The percentage of protein in one of the two samples—9.37—was much less than the guaranteed percentage, 12.2.

The Daisy Dairy Feed is a mixture of an oat product, containing much hull and gluten meal. The single sample analyzed contains much less protein and fat than is guaranteed.

The Lenox Stock Food, a mixture of cracked corn and oat and wheat products, contains the guaranteed percentages of both protein and fat.

The Chester Stock Feed, a mixture of corn and oat products with some rye, contains 3.8 per cent. more protein than is guaranteed.

Empire State Corn Feed is a mixture of wheat and oat products with leaves and stalks of unidentified plants and 3.77 per cent. of sand. It scarcely meets the manufacturer's guaranty as respects protein.

The Creamery Feed of the Buffalo Cereal Co. contains corn gluten, oat and wheat products and cotton seed meal.

The Dairy Feed made by the same company is a mixture of oat and corn products. The two last named feeds have no guaranty.

Blatchford's Calf Meal contains linseed, beans, cotton seed, carob beans and fenugreek. The percentages of protein and fat found in the meal are a little less than the guaranteed percentages.

THE DIGESTIBILITY OF FEEDING STUFFS.

A certain part of every feeding stuff is indigestible and passes through the body into the dung without doing anything to sustain the animal. The value of a commercial feed rests wholly in that portion of it which the animal can, under favorable conditions, digest or appropriate and make a part of itself. Some animals have greater power of digestion than others, and the amount of any ingredient, protein, fat, or fiber, digested by a given animal depends much on the proportion of other ingredients which are fed along with it. Thus, if starchy matter is fed in too large proportion, a considerable part of it will pass into the dung and be wasted. But fed in proper fashion over 90 per cent. of it may be taken up by the body and nourish it.

Table I gives the "digestion coefficients" of most of the feeds mentioned in Table IV.

The digestion coefficient of protein, for example, in cotton seed meal is 88. This means that in a properly made ration, neat cattle, in good health, may be expected, on the average, to digest about 88 parts out of every 100 parts of the protein of cotton seed meal of good quality. The table has no great mathematical precision, but is, nevertheless, a valuable general guide in feeding.

The use of the table is quite simple. Suppose analysis shows a certain sample of cotton seed meal to contain 43.5 per cent. of protein; that is, 43.5 pounds of protein in 100 pounds of the meal. It is desired to know how much *digestible* protein is contained in 100 pounds of meal. The table of "digestion coefficients" shows that of every 100 pounds of crude protein in cotton seed meal 88 pounds are digestible. It follows by the rule of three (100 is to 88 as 43.5 is to 38.28), that of the 43.5 pounds of protein 38.28 pounds are digestible. To apply the table, multiply the percentage found on analysis by the proper coefficient taken from the table and divide the product by 100. The result will be the percentage amount of *digestible* protein, fiber, etc., as the case may be.

In Table IV, under the averages of analyses, will be found calculated the average digestible nutrients contained in the different feeding stuffs, so far as the data at hand permit.

TABLE I.—DIGESTION COEFFICIENTS, OR PERCENTAGES OF THE FOOD INGREDIENTS, FOUND BY ANALYSIS, WHICH ARE DIGESTIBLE BY NEAT CATTLE.

(Jordan's Compilation, Office of Experiment Stations, Bulletin 77.)

	Protein.	Fiber.	Nitrogen-free Extract.	Fat.
Cotton Seed Meal	88	56	61	93
Linseed Meal, new process..	85	80	86	97
Linseed Meal, old process..	89	57	78	89
Corn Meal	68	--	95	92
Gluten Meal	88	--	90	94
Gluten Feed	86	78	89	84
Wheat Bran	78	29	69	68
Wheat Middlings	80	33	81	86
Wheat Mixed Feed	80	25	78	78
Oats*	78	20	76	83
Rye Meal	84	--	92	64
Malt Sprouts	80	33	68	100
Dried Brewers' Grains.....	79	52	58	91
H. O. Dairy Feed	78	41	70	86
H. O. Horse Feed	74	35	79	84
Quaker Oat Feed	81	43	67	89
Quaker Dairy Feed†	78	41	70	86
Victor Corn and Oat Feed‡	71	48	83	87

REGARDING THE PURCHASE OF COMMERCIAL FEEDING-STUFFS.

It needs to be constantly borne in mind that feeding-stuffs are bought to supply a deficiency of protein in those which are usually raised on the farm.

Hay, corn fodder, ensilage and stover form the basis and make up the bulk of the cattle food and should supply all the coarse feed, as well as most of the starch, sugar and fat which are needed.

They are, however, deficient in protein. The feeder's aim then is, or should be, to buy *digestible protein* at as low a price as he can, in forms relished by his stock. He is not in the market to buy mixtures of cattle medicine and food, nor starchy foods, nor woody fiber, nor the many wastes of factories, where so-called "breakfast goods" for human use are made.

It will very rarely pay him to buy anything which contains as little protein as corn meal. Corn meal he can generally raise

* Mentzel and Lengerke. † Assumed same as H. O. Dairy Feed.

‡ Assumed for all other corn and oat feeds.

much more cheaply than he can buy it—and corn meal fed with hay or ensilage needs the addition of some feed richer in protein, in order to avoid waste of starchy matter in feeding.

Table II is a list of the commercial feeding-stuffs mentioned in this Bulletin with the percentages of protein and fat in them, and their average prices, arranged according to the per cent. of protein, the ingredient which the buyer is chiefly concerned with.

Study of the table shows that we have six distinct groups of feeding-stuffs:

1. Cotton seed meal and Atlantic and Cream gluters with over 40 per cent. of protein and costing between \$28 and \$30 per ton.
2. The linseed and gluten meals containing between 30 and 40 per cent. of protein, the prices ranging from \$24.10 to \$32.00 per ton.
3. The gluten feeds, brewers' grains, malt sprouts and buckwheat middlings, containing from 25 to 30 per cent. of protein, prices ranging from \$18.50 to \$28.00 per ton.
4. The wheat feeds, H. O. Dairy Feed, Buffalo Cereal Co.'s Creamery Feed and rye feed, having between 15 and 20 per cent. of protein and costing from \$20.10 to \$30.00 per ton.
5. Lower grade feeds, containing from 14.5 to 10 per cent. of protein, which the feeder of dairy stock need not consider at all in buying protein to balance a ration made up of home-grown fodder, if he has home-grown shelled corn at his disposal.
6. Mixtures of corn and oat refuse, having less protein even than corn meal.

TABLE II.—COMMERCIAL FEEDS ARRANGED ACCORDING TO THE PERCENTAGES OF PROTEIN IN THEM.

<i>With more than 40 per cent. Protein.</i>	Protein. Per cent.	Fat. Per cent.	Cost. Per ton.
Atlantic Gluten Meal	48.44	2.44	\$28.00
Cream Gluten Meal	43.00	1.48	30.00
Cotton Seed Meal	42.96	10.28	29.70

TABLE II (*Continued*).—COMMERCIAL FEEDS ARRANGED ACCORDING TO THE PERCENTAGES OF PROTEIN IN THEM.

<i>With 30 to 40 per cent. Protein.</i>	Protein. Per cent.	Fat. Per cent.	Cost. Per ton.
Linseed Meal, New Process	39.79	2.13	31.00
Atlas Gluten Meal.....	36.28	15.51	24.10
Chicago Gluten Meal.....	35.46	2.82	31.30
King Gluten Meal.....	33.75	2.04	30.00
Linseed Meal, Old Process	32.82	7.81	32.00
<i>With 25 to 30 per cent. Protein.</i>			
Dried Brewers' Grains.....	29.72	6.91	
Buckwheat Middlings	28.56	7.74	20.00
Malt Sprouts.....	27.75	1.34	18.50
Buffalo Gluten Feed	27.24	3.16	25.60
Pekin Gluten Feed.....	26.91	3.39	28.00
Globe Gluten Feed.....	26.54	3.54	27.00
Waukegan Gluten Feed	25.12	3.51	26.00
Queen Gluten Feed	24.46	2.12	26.00
<i>With 15 to 20 per cent. Protein.</i>			
Buffalo Cereal Co.'s Creamery Feed.....	20.37	4.43	26.00
Spring Wheat Middlings.....	19.15	5.42	23.44
Winter Wheat Middlings.....	18.14	4.41	23.85
Winter Wheat Mixed Feed.....	17.72	4.58	22.00
H. O. Dairy Feed	17.72	4.64	30.00
Spring Wheat Mixed Feed	17.66	5.06	22.35
Winter Wheat Bran.....	17.10	4.56	23.37
Spring Wheat Bran.....	16.72	4.94	20.90
Rye Feed	15.43	3.10	26.00
<i>With 10 to 15 per cent. Protein.</i>			
Quaker Dairy Feed.....	14.50	3.57	
Buffalo Cereal Co.'s Dairy Feed.....	14.31	4.40	
Empire State Stock Feed.....	14.25	3.68	20.00
Ground Oats.....	12.95	4.54	34.75
Chester Stock Feed.....	12.87	4.19	
H. O. Horse Feed.....	12.77	4.80	29.25
Buffalo Cereal Co.'s Feed.....	12.75	4.78	29.00
Schumacher's Stock Feed.....	12.66	5.13	
Hominy Meal	11.57	8.91	28.25
Great Western Dairy Feed.....	10.59	2.71	22.00
Provender	10.47	4.13	30.30
Lenox Stock Feed.....	10.25	4.67	25.50
Corn Meal	9.89	3.90	28.75

TABLE II (*Continued*).—COMMERCIAL FEEDS ARRANGED ACCORDING TO THE PERCENTAGES OF PROTEIN IN THEM.

<i>With less Protein than Corn Meal.</i>	Protein. Per cent.	Fat. Per cent.	Cost. Per ton.
Excelsior Corn and Oat Feed	9.37	4.53	20.00
De-Fi " "	9.25	3.19	22.00
Victor " "	9.21	4.09	23.75
Vim Oat Feed	8.25	3.10	18.00
Boss "	8.01	2.75	
Royal "	6.87	1.95	18.00

It will also be noticed that the percentages of fat in these feeds are not very unlike, ranging between 1.5 and 5.4 per cent., with the exception of cotton seed meal, old process linseed meal, Atlas gluten meal, brewers' grains, hominy chops and buckwheat middlings, so that a rough comparison of the feeds can be made, *taking account of protein alone*, as that is the ingredient which the feeder is chiefly concerned in getting.

Such a comparison would show the following:

If 20 pounds of Protein in Atlantic Gluten cost.....	\$0.58
Then 20 pounds of Protein in Malt Sprouts and in Atlas Gluten cost about.....	.66
“ “ Cream Gluten and Cotton Seed Meal cost about .....	.68
“ “ Buckwheat Middlings cost about.....	.70
“ “ New Process Linseed Meal cost about .....	.77
“ “ Chicago Gluten and King Gluten Meal cost about.....	.88
“ “ Buffalo Gluten Feed and Old Process Linseed Meal cost about...	.98
“ “ Other Gluten Feeds “	1.05
“ “ Wheat Feeds, Buffalo Cereal Co.'s Creamery Feed cost about.....	1.20-1.40
“ “ Empire Stock Feed “	1.40
“ “ Rye Feed “	1.70
“ “ Other Feeds, chiefly Corn and Oat cost about.....	2.07-2.90

The above is not intended to do more than make a rough but practically just statement of the *comparative* cost of protein in the several classes of feeding-stuffs. Of course all feeds contain other valuable food ingredients besides protein and fat, but they are not ingredients which the feeder commonly needs to buy.

As a general rule, he cannot afford to buy anything belonging in classes 5 and 6. Home-grown corn meal makes anything in these groups superfluous.

It is the part of economy to raise all the corn meal which is needed at home, not to buy anything to balance the cattle ration containing less protein than wheat feeds, and to let all condimental and medicinal cattle foods alone.

THE WEIGHT OF ONE QUART OF VARIOUS FEED- ING-STUFFS.

The following table gives the weight of one quart of the feeds named, and is useful to calculate the weight of grain ration fed, from the measure which is almost universally used on farms.

This table was prepared by Mr. H. G. Manchester of West Winsted.

TABLE III.—THE AVERAGE WEIGHT OF ONE QUART OF EACH OF THE FEEDS NAMED.

BY H. G. MANCHESTER, WEST WINSTED.		Pounds.
Cotton Seed Meal.....		1.5
Linseed Meal, old process.....		1.1
Gluten Meal.....		1.7
Gluten Feed.....		1.2
Wheat Bran, coarse.....		0.5
Wheat Middlings, coarse.....		0.8
Wheat Middlings, fine.....		1.1
Mixed Wheat Feed.....		0.6
Corn Meal.....		1.5
Oats.....		1.2
Rye Bran.....		0.6
H. O. Dairy Feed.....		0.7
Victor Corn and Oat Feed.....		0.7

SUMMARY.

1. Cotton seed meal, linseed meal, the gluten meals and feeds, the factory mixed feeds of the American Cereal Co., the Great Western Cereal Co. and the H. O. Company, and the mixed corn and oat feeds, excepting provender, are, as a rule, sold

with a guaranteed percentage of protein and fat as is required by the state law. On the other hand, the wheat feeds, as well as some miscellaneous feeds of minor importance, are, as a rule, sold without guaranties, which is contrary to law.

2. The composition of most of the feeds which have guaranties is in substantial agreement with these guaranties.

3. The only evidence of deliberate fraud in the feed market which is shown by the analyses is the mixing of finely ground corn-cob or corn bran with mixed wheat feed, and selling this mixture in packages which do not bear the name of the manufacturers nor any statement giving the composition of the mixture.

Purchasers are warned against an article branded Eclipse Mixed Feed, which is a fraud of this kind, and the brands "Jersey Mixed Feed," "Winter Dairy Mixed Feed" and "Winter Mixed Feed" have all been found adulterated.

4. The prices charged at present for commercial feeding stuffs often bear no relation to their chemical composition or feeding value. It therefore requires special care and intelligence to select feeds which shall be economical for the dairyman or feeder of other stock. The standard feeds sold by reputable dealers, are, as a rule, much "cheaper" and more satisfactory than the low-priced factory wastes.

EXPLANATIONS CONCERNING THE ANALYSES OF FEEDING-STUFFS.

For those who are not familiar with the use of tables of feed analyses there are given, following page 57 of this bulletin, certain explanations which may help in a study of the tables.

TABLE IV. ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
	<i>Cotton Seed Meal.</i>		
7574	Cotton Seed Meal, Canary	R. W. Briggs & Co., Memphis, Tenn.	Berlin, J. C. Lincoln
7591	Cotton Seed Meal, Green Diamond	Chapin & Co., St. Louis, Mo.	Bristol, G. W. Eaton
7605	Cotton Seed Meal	Excelsior Mfg. Co.	Hartford, Daniels Mill Co.
7608	Cotton Seed Meal	American Cotton Oil Co., N. Y.	Hartford, Smith, Northam & Co.
7570	Cotton Seed Meal, Star Brand	Sledge & Wells, Memphis, Tenn.	Middletown, Coles Co.
7665	Cotton Seed Meal .....	..... Milledgeville, Ga.	New Canaan, C. H. Fairty.
7660	Cotton Seed Meal, Mag- nolia Brand	Chas. M. Cox Co., Bos- ton, Mass.	South Norwalk, M. T. Hatch ..
7490	Cotton Seed Meal, Canary	R. W. Briggs, Memphis, Tenn.	Yantic, A. R. Manning & Co. ...
9749	Cotton Seed Meal .....	.....	New Canaan, D. A. St. John ..
4590	Cotton Seed Meal, Dixie	Humphreys, Godwin & Co., Memphis, Tenn. ...	New Milford, Ackley, Hatch & Marsh
4604	Cotton Seed Meal	Strong, Lafferts & Co., N. Y.	New Milford, Ackley, Hatch & Marsh
4608	Cotton Seed Meal, Green Diamond	Chapin & Co., St. Louis, Mo.	New Milford, Ackley, Hatch & Marsh
	<i>Linseed Meal, New Process</i>		Average of 8 analyses
7313	Linseed Oil Meal	American Linseed Co., Chicago	Average digestible
7478	" "	American Linseed Co., Chicago	New Haven, R. G. Davis
7552	" "	American Linseed Co., Chicago	New London, Arnold Rudd
7488	" "	American Linseed Co., Chicago	Stafford, E. C. Dennis
	<i>Linseed Meal, Old Process.</i>		Yantic, A. R. Manning & Co. ...
7651	.....	American Linseed Co., New York	Bridgeport, Wm. H. Terry & Co.
7606	.....	American Linseed Co., New York	Hartford, Daniels Mill Co.
7613	.....	Hunter Bros., St. Louis ..	Hartford, Smith, Northam & Co.
7471	.....	Hauenstein & Co., Buf- falo, N. Y.	New London, E. H. Caulkins ..
7562	.....	Metzger Seed & Oil Co., Toledo, Ohio	Willimantic, H. A. Bugbee
7693	.....	Payne Bros. Co., Minne- apolis, Minn.	Winsted, Balch & Platt
			Average of the above 4 analyses of New Process Linseed Meal Average digestible
			Average of the above 6 analyses of Old Process Linseed Meal Average digestible

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7574	9.28	5.80	42.19	6.44	24.53	11.76	\$28.50
7591	8.02	6.27	45.12	5.16	24.77	10.66	30.00
7605	8.26	6.02	40.50	9.41	26.95	8.86	30.00
7608	7.09	6.04	45.37	6.26	26.20	9.04	30.00
7570	7.60	6.00	42.62	6.85	25.04	11.89	29.00
7665	8.50	6.05	43.37	6.31	25.68	10.09	30.00
7660	8.80	5.86	39.87	9.16	27.53	8.78	30.00
7490	8.55	6.65	44.62	5.46	23.26	11.16	30.00
9749	----	----	43.00	----	----	----	----
4590	----	----	47.81	----	----	----	----
4604	----	----	44.62	----	----	----	----
4608	----	----	45.25	----	----	----	----
	8.30	6.08	42.96	6.88	25.50	10.28	29.70
			37.80	3.85	15.55	9.56	
7313	11.73	5.40	40.63	7.84	32.10	2.30	29.00
7478	11.23	5.55	38.44	7.73	34.68	2.37	31.00
7552	10.45	5.34	40.12	8.36	33.76	1.97	32.00
7488	9.97	5.37	40.00	7.77	35.00	1.89	32.00
7651	10.02	4.90	35.00	7.58	35.67	6.83	30.00
7606	11.01	4.95	34.25	8.55	34.36	6.88	32.00
7613	10.20	5.20	31.56	9.61	34.76	8.67	32.00
7471	10.66	5.72	35.06	8.48	32.15	7.93	31.00
7562	10.49	6.82	31.56	8.89	34.16	8.08	32.00
7693	11.14	5.09	29.50	9.02	36.80	8.45	35.00
	10.84	5.41	39.79	7.92	33.91	2.13	31.30
			33.82	6.34	29.16	2.06	
	10.59	5.44	32.82	8.68	34.66	7.81	32.00
			29.20	4.94	27.03	6.95	

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Fiber Extract.	
7684	11.17	5.85	17.37	7.80	52.99	4.82	\$21.00
7459	11.18	6.30	17.50	11.34	48.90	4.78	20.00
7316	11.95	4.91	17.62	6.92	54.00	4.60	20.00
7416	11.75	5.92	17.37	8.50	51.81	4.65	21.00
7450	10.94	5.63	17.87	7.39	53.47	4.70	22.00
7519	10.95	5.92	18.19	8.20	52.72	4.02	20.00
7418	12.99	5.84	15.81	9.57	50.81	4.98	21.00
7422	12.47	6.21	16.12	8.39	52.73	4.08	24.00
7493	11.21	7.19	15.94	9.40	51.64	4.62	21.00
7510	11.17	5.56	17.87	6.98	53.79	4.63	25.00
7571	9.69	6.28	16.50	8.31	54.93	4.29	22.00
	11.41	5.96	17.10	8.44	52.53	4.56	23.37
			13.34	2.45	36.25	3.10	
7639	10.57	6.73	17.19	11.16	49.32	5.03	19.00
7498	11.30	6.70	16.37	11.08	48.92	4.73	24.00
7564	10.32	6.17	17.50	8.28	53.38	4.35	20.00
7646	11.39	5.66	16.75	9.26	52.43	4.51	21.00
7426	12.84	6.39	17.12	10.69	47.64	5.32	19.00
7704	10.96	6.41	16.62	9.74	50.98	5.29	22.00
7657	10.74	6.89	17.06	10.79	49.40	5.12	20.00
7662	11.78	5.80	14.87	9.74	52.99	4.82	21.00
7501	11.07	6.94	16.75	11.32	48.85	5.07	20.00
7505	10.90	6.46	17.31	9.20	50.84	5.29	20.00
7302	11.13	5.94	16.87	8.19	53.50	4.37	20.00
7649	10.67	6.75	16.56	10.18	50.99	4.85	20.00
7445	11.28	6.68	17.00	10.57	49.76	4.71	20.00
7546	10.80	7.07	15.12	12.25	49.76	5.00	23.00
7457	11.57	6.40	16.50	11.46	49.09	4.98	24.00

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7465	10.75	5.37	16.50	11.50	50.91	4.97	\$22.00
7441	11.95	7.01	18.06	10.69	47.18	5.11	22.00
7549	10.80	6.23	17.56	10.84	49.48	5.09	20.00
7533	12.08	4.96	15.94	11.00	50.89	5.13	21.00
	11.20	6.34	16.72	10.47	50.33	4.94	20.90
			13.04	3.04	34.73	3.36	
7318	11.76	3.46	17.94	4.23	58.29	4.32	23.00
7429	11.89	3.85	19.62	5.06	54.76	4.82	24.00
7477	12.51	3.63	17.31	5.15	56.76	4.64	25.00
7556	11.67	3.43	19.94	4.17	56.37	4.42	19.00
7495	11.90	3.26	17.75	3.15	59.15	4.79	25.00
7550	10.35	4.03	15.50	5.47	60.28	4.37	25.00
7633	10.85	2.23	20.50	1.83	60.94	3.65	28.00
7508	12.33	4.16	17.25	4.73	56.72	4.81	23.00
7417	12.04	4.76	19.06	6.93	52.35	4.86	22.50
7531	11.92	2.32	16.56	1.86	63.89	3.45	24.00
	11.72	3.51	18.14	4.26	57.96	4.41	23.85
			14.51	1.41	46.95	3.79	
7640	10.60	5.05	21.00	6.87	50.27	6.21	20.00
7638	10.93	2.69	20.87	1.71	59.50	4.30	25.00
7437	11.95	5.23	21.62	7.65	47.12	6.43	26.00
7502	12.02	4.26	17.12	8.78	52.92	4.90	21.00
7428	13.39	3.86	18.25	6.51	52.71	5.28	24.00
7511	12.01	4.98	17.75	8.92	50.50	5.84	22.00
7611	11.03	3.83	18.25	6.28	55.48	5.13	22.00
7480	11.76	4.87	19.50	7.05	51.56	5.26	24.00
7692	10.81	4.73	19.12	7.23	52.66	5.45	26.00
7301	11.53	5.11	19.25	8.64	50.17	5.30	21.00
7452	11.53	4.82	18.75	8.70	50.56	5.64	23.00

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
7314	<i>Middlings, Spring Wheat.</i> Middlings, M.....	Hecker-Jones-Jewell Co., New York.....	New Haven, R. G. Davis.....
7451	“ M.....	Hecker-Jones-Jewell Co., New York.....	Plantsville, Atwater Mills.....
7492	“	H. H. King & Co., Min- neapolis.....	Norwich, Norwich Grain Co. ..
7432	“	H. H. King & Co., Min- neapolis.....	Wallingford, E. E. Hall
7504	“ Fancy White	Listman Milling Co., Lacrosse, Wis.....	Jewett City, J. E. Leonard & Son
7506	“ Coarse Shorts	Listman Milling Co., Lacrosse, Wis.....	Jewett City, J. E. Leonard & Son
7524	“	New Prague Milling Co., New Prague, Minn.....	Danielson, Quinnebaug Store..
7653	“ Red Dog	New York City Milling Co.	Bridgeport, Wm. H. Terry & Co.
7408	“ Manhattan.....	“ “ “	East Haven, Hawkins & Forbes
7444	“ “	“ “ “	Southington, South. Lumber & Feed Co.....
7464	“ “	“ “ “	Stonington, S. H. Chesebro...
7545	“	Northwestern Con. Mill- ing Co., Minneapolis..	East Hampton, R. H. Hall
7456	“ B	Pillsbury, Minneapolis..	Centerbrook, W. J. Prann.....
7542	“ B	“ “	Colchester, E. F. Strong.....
7637	“ A	“ “	Thompsonville, H. K. Brainard
7650	“	Sheffield Milling Co., Minneapolis.....	Bridgeport, Wm. H. Terry & Co.
7475	“	Sheffield Milling Co., Minneapolis.....	New London, Arnold Rudd...
7557	“	Sheffield Milling Co., Minneapolis.....	Willimantic, W. D. Grant
7543	“ Northland.....	Simpson, Hendee & Co., New York.....	Colchester, E. F. Strong
7695	“	Thornton Chester Mill Co., Buffalo	Torrington, E. H. Talcott
7455	“ Standard	Washburn-Crosby Co., Minneapolis.....	Centerbrook, W. J. Prann.....
6003	“ Adrian	Washburn-Crosby Co., Minneapolis.....	Merrow, C. G. Wilcox
7486	“ “	Washburn-Crosby Co., Minneapolis.....	Yantic, A. R. Manning & Co...
7534	“ Snow's Fancy	E. S. Woodworth & Co., Minneapolis.....	Colchester, E. F. Strong
7497	“ Snow's Cream	E. S. Woodworth & Co., Minneapolis.....	Norwich, A. A. Beckwith
7466	“ Colonial.....	Miner-Hillard Milling Co., Wilkesbarre, Pa..	Average of above 36 analyses..
			Average digestible
			Groton, Groton Grain Co.....
			Guarantee

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7314	11.50	4.58	18.94	7.48	52.76	4.74	\$23.00
7451	11.08	4.45	17.87	7.77	53.71	5.12	24.00
7492	11.35	5.49	17.87	8.29	51.58	5.42	21.00
7432	11.98	4.71	20.31	6.81	50.16	6.03	26.00
7504	12.35	4.30	20.12	5.16	52.70	5.37	23.00
7506	11.68	4.71	20.75	5.76	51.47	5.63	21.00
7524	11.41	4.82	18.87	8.07	51.13	5.70	20.00
7653	11.70	3.23	19.62	2.41	57.88	5.16	24.00
7408	11.94	4.44	18.94	7.26	52.64	4.78	24.00
7444	11.31	4.93	16.87	8.08	52.91	5.90	22.00
7464	12.00	4.59	18.75	7.24	52.25	5.17	22.00
7545	10.25	5.30	16.87	10.32	51.84	5.42	24.00
7456	11.23	5.05	18.12	9.01	51.03	5.56	24.00
7542	11.81	5.37	16.37	11.18	49.77	5.50	22.00
7637	10.78	4.60	20.75	5.54	52.71	5.62	24.00
7650	11.72	4.00	20.00	4.56	53.92	5.80	21.00
7475	11.52	5.11	20.99	8.32	48.08	5.98	25.00
7557	10.67	5.27	18.00	8.52	52.13	5.41	19.00
7543	11.24	4.58	19.12	7.37	51.89	5.80	25.00
7695	11.69	4.08	18.12	6.46	54.52	5.13	25.00
7455	11.53	5.03	18.62	7.74	51.38	5.70	24.00
6003	13.13	3.04	20.06	2.41	56.99	4.37	27.00
7486	11.28	3.52	20.75	2.75	56.14	5.56	27.00
7534	11.69	3.88	20.50	3.09	55.50	5.34	26.00
7497	11.88	3.83	20.87	3.09	55.22	5.11	26.00
	11.56	4.51	19.15	6.75	52.61	5.42	23.44
			15.32	2.23	42.61	4.66	
7466	10.12	3.33	13.00	6.14	60.17	7.24	25.00
			13.6		62.5	6.8	

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
	<i>Mixed Feed from Winter Wheat.</i>		
7594	Mixed Feed, Acme	Acme Milling Co., Indianapolis, Ind.	Bristol, W. O. Goodsell
7423	" "	Acme Milling Co., Indianapolis, Ind.	Guilford, G. F. Walter
7636	" "	Acme Milling Co., Indianapolis, Ind.	Suffield, Spencer Bros.
7683	"	American Cereal Co., Chicago	Canaan, Ives & Pierce
7538	" Bluebell Fancy	American Cereal Co., Chicago	Colchester, E. F. Strong
7697	" "	American Cereal Co., Chicago	Torrington, E. H. Talcott
7300	" Buckeye	American Cereal Co., Chicago	New Haven, Abner Hendee ...
7701	" "	American Cereal Co., Chicago	Watertown, C. W. & T. F. Atwood
7485	" "	American Cereal Co., Chicago	Yantic, A. R. Manning & Co. .
7561	"	N. L. Berry, Providence, R. I.	Willimantic, H. A. Bugbee
7610	"	Blish Milling Co., Seymour, Ind.	Hartford, Smith, Northam & Co.
7431	"	Blish Milling Co., Seymour, Ind.	Wallingford, E. E. Hall
7317	"	L. C. Breed, St. Louis, Mo.	Guilford, F. H. Rolf
7529	"	Camp Spring Mill Co., St. Louis, Mo.	Putnam, Bosworth Bros.
7581	" "516"	C. M. Cox Co., Boston, Mass.	New Britain, C. W. Lines
7696	" "	C. M. Cox Co., Boston, Mass.	Torrington, E. H. Talcott
7647	" Hoosier	Geo. T. Evans, Indianapolis, Ind.	Ansonia, Ansonia Flour & Grain Co.
7708	"	Isaac Harter & Co., Toledo, Ohio.	North Haven, Co-op. Feed Co.
7555	"	W. S. Hills & Co., Boston, Mass.	Willimantic, W. D. Grant
7609	" Sunshine	Hunter Bros., St. Louis, Mo.	Hartford, Smith, Northam & Co.
7449	" "	Hunter Bros., St. Louis, Mo.	Plantsville, Atwater Mills
7513	"	Kehlror Bros., St. Louis, Mo.	Danielson, Waldo Bros.
7415	" Snow Flake	Lawrenceburg Roller Mills Co., Lawrenceburg, Ind.	New Haven, J. T. Benham Est.
7496	" "	Lawrenceburg Roller Mills Co., Lawrenceburg, Ind.	Norwich, A. A. Beckwith

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7594	11.62	5.21	17.75	7.11	53.65	4.66	\$22.00
7423	12.35	5.35	16.94	7.71	52.95	4.70	24.00
7636	11.01	5.35	17.75	6.88	54.47	4.54	22.00
7683	11.66	5.53	18.00	7.38	53.12	4.31	21.50
7538	11.65	5.53	17.69	7.02	53.63	4.48	21.00
7697	11.13	5.69	17.56	7.46	53.94	4.22	24.00
7300	12.72	4.36	16.87	5.78	55.73	4.54	20.00
7701	11.89	4.72	17.12	6.55	55.35	4.37	19.00
7485	11.80	4.73	17.75	7.12	54.03	4.57	21.00
7561	10.81	4.88	18.06	6.98	54.60	4.67	21.00
7610	11.21	5.59	17.50	8.64	52.21	4.85	23.00
7431	12.64	5.29	18.00	7.19	52.26	4.62	22.00
7317	11.90	5.15	17.62	7.27	53.44	4.62	21.00
7529	11.90	5.18	17.87	7.17	52.97	4.91	22.00
7581	10.77	5.62	17.37	7.94	53.12	5.18	21.00
7696	10.99	5.43	17.00	8.42	53.18	4.98	24.00
7647	11.09	5.47	17.69	7.06	54.23	4.46	22.00
7708	10.85	5.04	16.87	6.21	56.52	4.51	22.00
7555	11.47	5.23	18.69	6.90	53.49	4.22	20.00
7609	11.20	4.96	18.37	8.36	52.47	4.64	23.00
7449	11.86	4.86	17.69	6.99	53.91	4.69	24.00
7513	11.58	5.49	16.94	7.47	53.82	4.70	24.00
7415	12.55	5.56	17.69	7.43	52.51	4.26	21.00
7496	11.42	5.47	17.62	6.96	54.28	4.25	24.00

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
7585	Mixed Feed, Kyome ---	J. E. M. Mill Co., Frank- ford, Ky.	New Britain, Hugh Reynolds..
7575	" -----	Rex Milling Co., Kansas City, Mo.	Berlin, J. C. Lincoln.....
7443	" -----	Rex Milling Co., Kansas City, Mo.	Southington, South. Lumber & Feed Co.
7673	" -----	Simpson, Hendee & Co., New York.....	Danbury, F. C. Benjamin & Co.
7528	" -----	Sparks Milling Co., Alton, Ill.	Putnam, F. M. Cole & Co.
7641	" Quincy ---	Taylor Bros. Milling Co.	Thompsonville, H. K. Brainard
7517	" Farmers Favorite	Valley City Milling Co., Grand Rapids ---	Danielson, Quinnebaug Store
7677	" " ---	Valley City Milling Co., Grand Rapids ---	New Milford, Ackley, Hatch & Marsh -----
7559	" -----	Washington Flour Mill Co., Washington, Mo.	Willimantic, E. A. Buck -----
7635	" Erie -----	-----	Suffield, Spencer Bros.
	<i>Mixed Feed, unclassified.</i>		Average of the above 34 analyses Average digestible -----
7407	Mixed Feed -----	M. F. Barringer, Phila., Pa. -----	East Haven, Hawkins & Forbes
7703	" -----	M. M. Co., -----	Waterbury, Spencer & Pierpont Co. -----
4938	" * -----	T. B. Atwater, Plantsville	-----
	<i>Mixed Feed from Spring Wheat</i>		
7484	Mixed Feed, U. S.	Chapin & Co., Boston...	Yantic, A. R. Manning & Co...
7577	" Columbia ---	Chas. M. Cox Co., Boston	New Britain, M. D. Stanley ---
7602	" Queen ---	Hecker-Jones-Jewell Co., New York ---	Hartford, L. C. Daniels Grain Co. -----
7554	" " ---	Hecker-Jones-Jewell Co., New York ---	Willimantic, W. D. Grant -----
7541	" "B" ---	Abner Hendee, New Haven -----	Colchester, E. F. Strong -----
7512	" Boston ---	Imperial Milling Co., Duluth, Minn.	Danielson, Waldo Bros.
7425	" " ---	Imperial Milling Co., Duluth, Minn.	Guilford, Morse & London ---
7621	" " ---	Imperial Milling Co., Duluth, Minn.	Manchester, Manchester Elev. Co. -----
7520	" Hiawatha..	Wm. Listman Milling Co., Superior, Wis. ---	Danielson, The Young Bros. Co. -----
7676	" Fancy ---	Pillsbury, Minneapolis..	Danbury, O. H. Meeker.....
7679	" " ---	Pillsbury, Minneapolis..	New Milford, Ackley, Hatch & Marsh -----
7700	" -----	Red Lake Falls Milling Co., Red Lake, Minn.	Watertown, C. W. & T. F. Atwood -----
7584	" Angola....	Simpson Hendee & Co., New York.....	New Britain, Hugh Reynolds..

* Sent by Miss M. A. Neale, Southington, Conn.

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7585	10.55	4.83	18.37	8.15	53.63	4.47	\$23.00
7575	10.62	5.67	18.50	7.61	52.98	4.62	22.00
7443	12.00	5.68	19.00	8.24	50.36	4.72	21.00
7673	10.71	5.19	17.75	6.59	54.84	4.92	20.00
7528	11.44	5.68	18.25	7.54	52.69	4.40	22.00
7641	10.88	5.72	17.50	7.96	53.37	4.57	24.00
7517	12.17	5.02	17.19	7.60	53.58	4.44	23.00
7677	10.57	5.48	16.75	7.49	55.00	4.71	22.00
7559	10.86	5.46	17.87	6.60	54.45	4.76	21.00
7635	11.39	5.12	18.62	6.92	53.69	4.26	22.00
	11.45	5.28	17.72	7.31	53.66	4.58	22.00
	----	----	14.18	1.82	41.85	3.57	-----
7407	11.75	5.52	16.81	6.39	55.04	4.49	23.00
7703	10.87	5.53	17.19	6.36	55.61	4.44	24.00
4938	----	----	18.00	----	-----	----	22.00
7484	11.46	5.41	17.31	7.88	52.52	5.42	21.00
7577	11.10	4.96	16.31	8.48	53.99	5.16	22.00
7602	10.79	6.24	16.62	10.45	51.03	4.87	22.00
7554	10.23	6.04	16.50	8.75	53.83	4.65	20.00
7541	11.50	5.22	17.94	7.51	53.19	4.64	21.00
7512	11.86	5.83	18.62	8.68	49.98	5.03	24.00
7425	13.00	5.74	17.94	9.14	48.92	5.26	21.00
7621	11.14	5.21	18.62	7.44	52.49	5.10	24.00
7520	10.51	5.22	17.75	7.77	53.48	5.27	20.00
7676	10.81	5.59	17.62	7.70	52.73	5.55	24.00
7679	11.11	5.44	17.87	7.29	52.67	5.62	23.00
7700	11.07	5.74	17.25	8.07	52.85	5.02	20.00
7584	8.53	5.63	17.75	10.01	52.87	5.21	22.00

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
7709	Mixed Feed, Star and Crescent	Star and Crescent Milling Co.	North Haven, Co-op. Feed Co. East Hartford, W. J. Cox Saybrook, J. H. Day, Jr. Stafford, E. C. Dennis Average of the above 17 analyses Average digestible
7616	Mixed Feed	Thornton & Chase, Buffalo, N. Y.	
7458	“ Diamond .....	.....
7548	“ “Erie” .....	.....
	MAIZE PRODUCTS. <i>Corn Meal.</i>		
7648	Meal	Ansonia Flour and Grain Co., Ansonia	Ansonia, Ansonia Flour and Grain Co.
7573	“	Husted Milling Co., Buffalo	Berlin, J. C. Lincoln
7668	“	Johnson & Morrison, Bethel	Bethel, Johnson & Morrison
7654	“	Berkshire Mills Co., Bridgeport	Bridgeport, Berkshire Mills Co.
7652	“	Wm. H. Terry & Co., Bridgeport	Wm. H. Terry & Co.
7593	“	G. W. Eaton, Bristol	Bristol, G. W. Eaton
7599	“	W. O. Goodsell, Bristol	W. O. Goodsell
7686	“	Ives & Pierce, Canaan	Canaan, Ives & Pierce
7535	“	E. F. Strong, Colchester	Colchester, E. F. Strong
7674	“	F. C. Benjamin & Co., Danbury	Danbury, F. C. Benjamin & Co.
7526	“	Quinnebaug Mill, Danielson	Danielson, Quinnebaug Store
7521	“	Young Bros. Co., Danielson	Young Bros. Co.
7617	“	W. J. Cox, East Hartford	East Hartford, W. J. Cox
7410	“	Hawkins & Forbes, East Haven	East Haven, Hawkins & Forbes
7319	“	Coles Co., Middletown	Guilford, F. H. Rolf
7622	“	Manchester Elev. Co., Manchester	Manchester, Manch. Elev. Co.
6004	“	Cutler Co., North Wilbraham, Mass.	Morrow, C. G. Wilcox
6005	“	S. H. Vilas, Swanton, Vt.	“ “
7572	“	Coles Co., Middletown	Middletown, Coles & Co.
7568	“	Meech & Stoddard, Middletown	Meech & Stoddard
7586	“	Hugh Reynolds, New Britain	New Britain, Hugh Reynolds
7579	“	M. D. Stanley, New Britain	M. D. Stanley
7315	“	R. G. Davis, New Haven	New Haven, R. G. Davis
7307	Buckeye Pure Gold	American Cereal Co.	Abner Hendee
7474	“	E. W. Bailey & Co., Montpelier, Vt.	New London, E. H. Caulkins

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch,gum,etc.)	Ether Extract.	
7709	11.04	4.95	18.62	6.64	54.04	4.71	\$23.00
7616	10.60	5.72	18.12	9.52	50.88	5.16	22.00
7458	11.67	5.24	17.50	8.93	52.30	4.36	26.00
7548	10.26	5.67	17.81	7.83	53.48	4.95	25.00
	10.98	5.52	17.66	8.36	52.42	5.06	22.35
	----	----	14.13	2.09	40.89	3.95	
7648	12.99	1.29	10.12	2.76	68.75	4.09	29.00
7573	13.01	1.03	10.19	0.67	71.83	3.27	29.00
7668	12.60	1.15	9.62	0.98	71.74	3.91	29.00
7654	13.30	1.42	9.44	1.55	70.20	4.09	30.00
7652	13.66	1.12	9.56	2.07	70.14	3.45	27.00
7593	8.38	1.25	10.31	1.53	74.50	4.03	30.00
7599	12.96	1.27	10.12	2.02	69.33	4.30	29.00
7686	13.77	1.32	10.94	1.60	68.76	3.61	28.00
7535	13.99	1.27	9.69	1.35	69.51	4.19	28.00
7674	13.49	1.38	9.62	1.91	69.50	4.10	30.00
7526	13.36	1.31	9.87	1.69	69.67	4.10	28.00
7521	12.80	1.52	10.31	2.00	68.58	4.79	28.00
7617	13.48	1.23	9.75	1.48	70.05	4.01	29.00
7410	14.11	1.31	9.56	1.81	69.26	3.95	30.00
7319	13.70	1.34	9.69	2.11	69.28	3.88	28.00
7622	13.46	1.19	10.12	1.57	69.67	3.99	29.00
6004	13.85	1.11	10.25	2.41	68.30	4.08	28.00
6005	13.53	1.45	9.44	2.49	69.01	4.08	28.00
7572	13.00	1.36	9.69	1.74	70.13	4.08	30.00
7568	11.77	1.33	9.69	1.69	71.59	3.93	29.00
7586	13.13	1.28	9.94	2.91	69.01	3.73	29.00
7579	13.38	1.17	10.12	1.43	70.25	3.65	29.00
7315	14.32	1.27	9.69	1.71	68.94	4.07	28.00
7307	14.15	0.35	9.19	0.13	75.14	1.04	35.00
7474	13.44	1.36	9.87	1.82	69.43	4.08	28.00

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
7680	Meal	Husted Milling Co., Buffalo, N. Y.	New Milford, Ackley, Hatch & Marsh
7682	“ from No. 2 corn ..	T. Soule & Co., New Milford	New Milford, T. Soule & Co. ...
7658	“	Brooklyn Elevator Co., New York	Norwalk, Holmes, Keeler & Selleck Co.
7500	“	A. A. Beckwith, Norwich	Norwich, A. A. Beckwith
7494	“	Cutler Co., North Wil- braham, Mass.	Norwich Grain Co.
7453	“	Atwater Mills, Plantsville	Plantsville, Atwater Mills
7532	“	Bosworth Bros., Putnam	Putnam, Bosworth Bros.
7623	“	Rockville Milling Co., Rockville	Rockville, Rockville Milling Co.
6001	“	Smith, Northam & Co., Hartford	Rockville, Edward White
7460	“	Meech & Stoddard, Mid- dletown	Saybrook, J. H. Day, Jr.
7447	“	Southington Lumber and Feed Co.	Southington, So. Lumber and Feed Co.
7551	“	E. C. Dennis, Stafford ..	Stafford, E. C. Dennis
7663	“	Diamond Mills, Buffalo	Stamford, E. E. Scofield
7463	“	Narragansett Milling Co., East Providence, R. I.	Stonington, S. H. Chesebro ...
7631	“	Diamond Mills, Buffalo, N. Y.	Suffield, Arthur Sikes
7642	“	H. K. Brainard, Thomp- sonville	Thompsonville, H. K. Brainard
7707	“	Miner, Hillard Milling Co., Wilkesbarre, Pa. ...	Waterbury, Platt's Mill
6007	“	E. A. Buck & Co., Willimantic	Willimantic, E. A. Buck & Co.
6008	“	E. W. Bailey & Co., Montpelier, Vt.	H. A. Bugbee
6009	“	Cutler Co., North Wil- braham, Mass.	“ “
6006	“	S. H. Vilas, Swanton, Vt.	W. D. Grant
7558	“	“ “ “	“ “ “
7489	“	A. R. Manning & Co., Yantic	Yantic, A. R. Manning & Co. ...
			Average of the above 43 analyses
			Average digestible
	<i>Gluten Meal.</i>		
7615	Cream Gluten Meal	Chas. Pope Glucose Co., Chicago, Ill.	Hartford, Smith, Northam & Co. Guaranty
			Digestible
4605	Atlas Gluten Meal*	Atlas Feed & Milling Co., Peoria, Ill.	
7530	“ “ “	Atlas Feed & Milling Co., Peoria, Ill.	Putnam, Bosworth Bros.

* Sent by F. B. Ashton, Middletown. See page 12.

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch,gum,etc.)	Ether Extract.	
7680	12.13	1.61	10.19	2.28	69.25	4.54	\$30.00
7682	12.44	1.29	10.37	1.94	69.83	4.13	30.00
7658	12.22	1.47	10.25	2.22	69.41	4.43	32.00
7500	13.50	1.33	10.94	2.22	68.59	3.42	28.00
7494	13.44	1.32	9.94	1.47	70.01	3.82	27.50
7453	14.53	1.24	9.75	1.54	69.06	3.88	28.00
7532	14.27	1.29	9.69	2.06	68.42	4.27	27.00
7623	13.57	1.29	9.87	1.61	69.72	3.94	29.00
6001	14.55	1.66	9.81	2.76	66.79	4.43	29.00
7460	13.94	1.14	9.56	2.02	70.20	3.14	30.00
7447	13.27	1.28	10.00	1.78	69.73	3.94	29.00
7551	12.19	1.36	9.75	1.90	70.71	4.09	28.00
7663	13.36	1.12	10.12	0.95	70.80	3.65	30.00
7463	13.30	1.26	9.75	1.78	69.98	3.93	27.00
7631	13.60	1.04	9.25	1.01	71.94	3.16	29.00
7642	13.48	1.43	9.94	1.58	69.56	4.01	28.00
7707	12.56	1.37	9.25	1.68	71.16	3.98	28.00
6007	14.33	1.27	10.19	2.57	67.67	3.97	28.00
6008	14.35	1.28	9.25	2.34	68.70	4.08	28.00
6009	14.48	1.57	11.00	3.09	65.90	3.96	28.00
6006	15.01	1.37	9.50	2.44	67.71	3.97	27.00
7558	13.19	1.23	9.87	1.59	70.09	4.03	27.00
7489	13.35	1.26	9.87	1.26	70.40	3.86	28.00
	13.35	1.30	9.89	1.83	69.73	3.90	28.75
	----	----	6.73	----	66.24	3.59	
7615	10.23	0.83	43.00	1.20	43.26	1.48	30.00
	----	----	34.12	----	----	3.20	
	----	----	37.84	----	38.93	1.39	
4605	5.29	1.64	36.44	11.54	29.04	16.05	22.70
7530	8.31	1.61	36.12	11.35	27.63	14.98	26.00

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
6135	Atlas Gluten Meal* ----	Atlas Feed & Milling Co., Peoria, Ill. -----	Guaranty ----- Average of above 2 analyses... Average digestible -----
7537	Chicago Gluten Meal	Glucose Sugar Refining Co., Chicago, Ill.	Colchester, E. F. Strong -----
7553	" " " ----	Glucose Sugar Refining Co., Chicago, Ill.	Stafford, E. C. Dennis -----
7487	" " " ----	Glucose Sugar Refining Co., Chicago, Ill.	Yantic, A. R. Manning & Co. . Guaranty ----- Average of the above 3 analyses Average digestible -----
6122	Atlantic Gluten Meal† ---	Atlantic Starch Works, Westport, Conn.	-----
7252	" " " † ---	Atlantic Starch Works, Westport, Conn.	-----
9759	" " " † ---	Atlantic Starch Works, Westport, Conn.	-----
9750	Extra Strong Gluten Meal§ -----	Atlantic Starch Works, Westport, Conn.	-----
7614	King Gluten Meal -----	National Starch Co., Indianapolis, Ind. ...	Hartford, Smith, Northam & Co. Guaranty ----- Digestible -----
<i>Gluten Feed.</i>			
7598	Buffalo Gluten Feed ----	Glucose Sugar Refining Co., Chicago, Ill.	Bristol, W. O. Goodsell -----
7406	" " " ----	Glucose Sugar Refining Co., Chicago, Ill.	East Haven, Hawkins & Forbes
7420	" " " ----	Glucose Sugar Refining Co., Chicago, Ill.	Guilford, G. F. Walter -----
7427	" " " ----	Glucose Sugar Refining Co., Chicago, Ill.	Hamden, Ira W. Beers -----
7567	" " " ----	Glucose Sugar Refining Co., Chicago, Ill.	Middletown, Meech & Stoddard
7578	" " " ----	Glucose Sugar Refining Co., Chicago, Ill.	New Britain, M. D. Stanley ----
7414	" " " ----	Glucose Sugar Refining Co., Chicago, Ill.	New Haven, J. T. Benham Est. Guaranty ----- Average of above 7 analyses... Average digestible -----
7304	Globe Gluten Feed -----	New York Glucose Co. ...	New Haven, Abner Hendee ...
7473	" " " -----	" " " -----	New London, E. H. Caulkins..

* Sent by E. M. Miller, Newtown. See page 12.

† Sent by F. T. Bradley, Saybrook. See page 12.

‡ Sent by R. G. Davis, New Haven. § Sent by Atlantic Starch Works, Westport.

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch,gum,etc.)	Ether Extract.	
6135	----	----	35.62	----	----	14.17	\$23.70
	----	----	36.0	----	----	14.0	
	6.80	1.63	36.28	11.45	28.33	15.51	24.10
	----	----	31.92	----	25.49	14.58	
7537	10.68	1.75	34.50	1.13	49.30	2.64	31.00
7553	9.82	1.46	37.44	1.66	46.16	3.46	32.00
7487	10.88	1.63	34.44	1.15	49.53	2.37	31.00
	----	----	38.0	----	----	3.0	
	10.46	1.61	35.46	1.31	48.34	2.82	31.30
	----	----	31.19	----	43.51	2.65	
6122	10.95	3.64	48.88	5.61	28.72	2.20	31.00
7252	----	----	52.88	----	----	----	31.00
9759	9.70	4.04	43.56	9.01	31.01	2.68	28.00
9750	7.93	1.87	68.88	5.74	15.03	0.55	
7614	10.20	1.24	33.75	1.99	50.78	2.04	30.00
	----	----	35.5	----	----	3.7	
	----	----	29.70	----	45.70	1.92	
7598	8.98	2.52	26.31	5.61	53.06	3.52	25.00
7406	10.70	1.77	26.81	6.07	50.79	3.86	25.00
7420	10.78	2.30	28.19	6.65	49.07	3.01	26.00
7427	11.95	1.72	27.37	6.19	49.96	2.81	24.50
7567	10.15	2.45	27.50	6.44	50.50	2.96	26.00
7578	9.25	2.41	27.44	6.60	51.08	3.22	27.50
7414	10.38	2.17	27.06	6.14	51.50	2.75	25.00
	----	----	27.5	----	----	3.3	
	10.31	2.19	27.24	6.24	50.86	3.16	25.60
	----	----	23.43	4.87	45.27	2.65	
7304	9.76	1.52	26.00	7.24	51.56	3.92	27.00
7473	10.17	1.48	27.62	7.19	49.58	3.96	26.00

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
7499	Globe Gluten Feed . . .	New York Glucose Co. .	Norwich, A. A. Beckwith . . . Guaranty Average of the above 3 analyses Average digestible
7509	Pekin Gluten Feed	Illinois Sugar Refining Co., Chicago, Ill.	Danielson, Waldo Bros.
7612	" " "	Illinois Sugar Refining Co., Chicago, Ill.	Hartford, Smith, Northam & Co. Guaranty Average of the above 2 analyses Average digestible
7424	Queen Gluten Feed	National Starch Co., New York	Guilford, Morse & Landon . . .
7476	" " "	National Starch Co., New York	New London, Arnold Rudd . . . Guaranty Average of the above 2 analyses Average digestible
7514	Waukegan Gluten Feed .	U. S. Sugar Refining Co.	Danielson, Waldo Bros. Guaranty Digestible
7645	Gluten Feed	J. E. Soper & Co., Boston	Ansonia, Ansonia Flour and Grain Co. Digestible
<i>Hominy Feed.</i>			
7576	Hominy Meal	Husted Milling Co., Buffalo, N. Y.	Berlin, J. C. Lincoln
7685	" Feed	Suffern, Hunt & Co., Decatur, Ill.	Canaan, Ives & Pierce
7536	" Meal, Geneva	Simpson Hendee, New York	Colchester, E. F. Strong
7672	" "	C. M. Cox & Co., Boston	Danbury, F. C. Benjamin & Co.
7515	" " K'yst'ne F'cy	Fish & Co., New York . .	Danielson, Waldo Bros.
7522	" Chop	C. M. Cox & Co., Boston	The Young Bros. Co.
7603	" Feed, "G"	M. F. Barringer, Phila., Pa.	Hartford, L. C. Daniels Grain Co.
7607	" "	Hunter Bros., St. Louis, Mo.	Hartford, Daniels Mill Co. . . .
7507	" "	Simpson Hendee, New York	Jewett City, J. E. Leonard . . .
7436	" Meal	Miner, Hillard Milling Co., Wilkesbarre, Pa. . . .	Meriden, A. H. Cashen
7439	" Feed	Buffalo Cereal Co., Buffalo, N. Y.	Meriden, Meriden Grain & Feed Co.
7565	" Chop	A. F. Lane, New York . .	Middletown, Meech & Stoddard

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7499	10.27	1.44	26.00	7.12	52.44	2.73	\$28.00
	-----	-----	27.5	-----	-----	3.3	
	10.07	1.48	26.54	7.18	51.19	3.54	27.00
	-----	-----	22.82	5.60	45.56	2.97	
7509	9.65	2.23	26.62	6.47	52.03	3.00	26.00
7612	9.02	0.90	27.19	7.82	51.29	3.78	30.00
	-----	-----	27.5	-----	-----	3.3	
	9.33	1.56	26.91	7.14	51.67	3.39	28.00
	-----	-----	23.13	5.57	45.99	2.85	
7424	10.54	0.59	24.87	7.21	54.53	2.26	25.00
7476	9.80	0.62	24.06	7.97	55.57	1.98	27.00
	-----	-----	27.1	-----	-----	3.2	
	10.17	0.60	24.46	7.59	55.06	2.12	26.00
	-----	-----	21.04	5.92	48.99	1.78	
7514	11.50	1.11	25.12	6.81	51.95	3.51	26.00
	-----	-----	27.3	-----	-----	3.3	
	-----	-----	21.60	5.31	46.24	2.94	
7645	8.59	1.42	24.69	6.65	56.04	2.61	25.00
	-----	-----	21.23	5.19	49.87	2.19	
7576	9.98	2.78	11.14	4.17	62.29	9.64	27.00
7685	10.10	3.08	11.56	4.64	60.85	9.77	28.00
7536	8.56	2.62	11.50	4.27	64.51	8.54	26.00
7672	7.56	2.95	12.12	4.39	62.57	10.41	24.00
7515	10.52	2.64	9.69	8.84	62.19	6.12	26.00
7522	9.43	2.80	11.50	4.20	63.00	9.07	25.00
7603	9.83	2.92	12.50	4.29	61.86	8.60	25.00
7607	10.26	3.45	11.75	4.52	59.95	10.07	25.00
7507	9.90	2.82	12.06	4.71	60.64	9.87	27.00
7436	11.20	2.57	11.12	4.62	63.17	7.32	27.00
7439	9.52	2.73	11.62	4.45	62.78	8.90	28.00
7565	10.82	2.76	11.81	3.73	62.06	8.82	25.00

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
7309	White Hominy Meal	Chas. Payne, New York	New Haven, R. G. Davis
7479	Hominy Meal, Niagara	Chapin & Co.	New London, Beebe & Bragan
7678	" Feed	Hunter Bros., St. Louis	New Milford, Ackley, Hatch & Marsh
7661	" "	Miner, Hillard Milling Co., Wilkesbarre, Pa.	South Norwalk, M. T. Hatch
7503	" Chop	Hollister, Chase & Co., N. Y.	Plainfield, J. P. Kingsley & Son
7664	" Feed	Narragansett Milling Co., East Providence, R. I.	Stamford, E. E. Scofield
7462	" Chop	Buffalo Cereal Co., Buffalo, N. Y.	Stonington, S. H. Chesebro
7632	" Feed	Chapin & Co., Boston, Mass.	Suffield, Arthur Sikes
7634	" "	C. M. Cox & Co., Boston, Mass.	Spencer Bros.
7434	" "	Simpson Hendee, New York	Wallingford, E. E. Hall
7699	" Meal	Hunter Bros., St. Louis	Watertown, C. W. & T. F. Atwood
7560	" Feed	W. T. Reynolds & Co., Poughkeepsie, N. Y.	Willimantic, H. A. Bugbee
7688	" Meal	M. F. Barringer, Phila., Pa.	Winsted, Balch & Platt
7482	" Chop	C. W. Campbell & Co., Westerly, R. I.	Yantic, A. R. Manning & Co.
4611	Chops		
7873	Hominy Feed*		
			Average of 26 analyses
			Average digestible
	RYE PRODUCTS.		
7644	Rye Bran	Blodgett Milling Co., Janesville, Wis.	Ansonia, Ansonia Flour and Grain Co.
7544	Rye Feed	Coles & Co., Middletown	East Hampton, R. H. Hall
7566	"	H. D. Stone & Co., Rochester, N. Y.	Middletown, Meech & Stoddard
7412	"	H. D. Stone & Co., Rochester, N. Y.	New Haven, J. T. Benham Est.
7306	"	H. D. Stone & Co., Rochester, N. Y.	Abner Hendee
7694	"	Miner, Hillard Milling Co., Wilkesbarre, Pa.	Torrington, E. H. Talcott
			Average of above 6 analyses
			Average digestible
	BARLEY PRODUCTS.		
7675	Malt Sprouts	M. F. Barringer, Philadelphia, Pa.	Danbury, O. H. Meeker
7308	" "	Mueller & Co., Milwaukee, Wis.	New Haven, R. G. Davis
			Average of above 2 analyses
			Average digestible

* Sent by S. T. Stockwell, West Simsbury.

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7309	12.12	2.63	11.44	4.16	61.16	8.49	\$25.00
7479	9.33	3.00	12.00	4.05	62.11	9.51	27.00
7678	9.96	3.07	12.37	4.77	61.27	8.56	28.00
7661	8.27	2.70	11.62	4.64	63.65	9.12	27.00
7503	9.71	2.82	10.87	6.62	61.55	8.43	24.50
7664	10.70	2.53	11.37	4.81	62.47	8.12	26.00
7462	10.01	2.29	9.37	10.10	63.12	5.11	26.00
7632	8.41	2.76	11.50	4.55	64.11	8.67	27.00
7634	11.01	2.66	11.75	4.00	62.13	8.45	26.00
7434	9.67	2.60	11.62	4.32	63.15	8.64	25.00
7699	9.87	2.94	11.56	4.54	61.42	9.67	27.00
7560	9.83	2.85	11.37	4.18	62.78	8.99	26.00
7688	11.59	2.60	11.00	4.13	62.71	7.97	26.00
7482	10.17	2.73	11.12	6.48	60.86	8.64	27.00
4611	8.53	----	11.87	----	----	9.00	
7873	12.00	2.74	10.94	4.12	61.64	8.56	26.00
	9.99	2.80	11.57	4.53	62.20	8.91	28.25
	----	----	7.87	----	59.09	8.19	
7644	8.63	5.66	15.19	6.33	60.42	3.77	27.00
7544	11.81	3.07	14.94	3.58	63.60	3.00	24.00
7566	11.91	3.27	15.12	4.18	62.66	2.86	24.00
7412	12.60	3.58	16.19	4.25	60.37	3.01	25.00
7306	13.78	2.80	15.00	3.39	62.16	2.87	30.00
7694	11.91	3.49	16.12	4.76	60.62	3.10	25.00
	11.77	3.64	15.43	4.41	61.65	3.10	26.00
	----	----	12.95	----	56.72	1.98	
7675	8.67	5.43	26.94	13.72	43.95	1.29	18.00
7308	10.34	5.81	28.56	12.30	41.60	1.39	19.00
	9.50	5.62	27.75	13.01	42.78	1.34	18.50
	----	----	22.20	4.29	29.09	1.34	

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
4635	Brewers Grains A*		
4636	“ “ B*		
			Average of above 2 analyses...
			Average digestible
	OAT PRODUCTS.		
7601	Ground Oats	W. O. Goodsell, Bristol.	Bristol, W. O. Goodsell
7588	“	Hugh Reynolds, New Britain	New Britain, Hugh Reynolds..
7580	“	M. D. Stanley, New Britain	M. D. Stanley.....
7411	“	J. T. Benham Est., New Haven	New Haven, J. T. Benham Est.
			Average of above 4 analyses...
			Average digestible
7671	Royal Oat Feed	Great Western Cereal Co., Chicago, Ill.	Danbury, F. C. Benjamin & Co.
	BUCKWHEAT PRODUCTS		
7525	Buckwheat Middlings...	Quinnebaug Mill, Danielson	Danielson, Quinnebaug Store..
9747	Buckwheat Hulls†		
	MISCELLANEOUS BY-PRODUCTS.		
6002	Peanut Bran	Phoenix Milling Co., Petersburg, Va.	Rockville, Edward White
7625	Broken Peanuts	Phoenix Milling Co., Petersburg, Va.	Rockville, Edward White
4829	Biles' Distillers Grains XXXX†		
4592	Cornaline§		
4716	Gee's Germ Middlings ..	G. E. Gee Grain Co., Minneapolis, Minn.	
4682	“ “ “ ..	G. E. Gee Grain Co., Minneapolis, Minn.	
6112	Seed Meal|| .....		
6111	Ready Bits (damaged)*|| ..		
4591	Corn Feed**		
7310	White Meal	M. F. Barringer, Philadelphia, Pa.	New Haven, R. G. Davis
4612	Dam'g'd Cerealine Feed†† ..		

* Sent by Vine Hill Farm Co., West Hartford.

† Sent by L. C. Hunt, Madison.

† Sent by James H. Webb, Hamden.

§ Sent by Smith, Northam & Co., Hartford.

† Sent by P. A. Holt, Elmwood.

¶ Sent by C. L. Burwell, New Haven.

** Sent by Vine Hill Farm Co., Elmwood.

†† Sent by James F. Brown, Jr., North Stonington.

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
4635	9.31	2.98	31.62	12.83	36.35	6.91	22.00
4636	8.44	3.15	27.81	15.17	38.52	6.91	22.00
	8.88	3.06	29.72	14.00	37.43	6.91	
	---	----	23.47	7.28	21.71	6.29	
7601	11.34	3.25	12.06	10.72	57.52	5.11	32.00
7588	11.30	3.28	13.06	10.97	56.70	4.69	30.00
7580	7.51	2.64	13.00	7.40	65.78	3.67	39.00
7411	12.47	3.01	13.69	8.58	57.54	4.71	31.00
	10.65	3.05	12.95	9.41	59.40	4.54	
	----	----	10.10	1.88	45.14	3.77	
7671	7.88	9.88	6.87	24.91	48.51	1.95	18.00
7525	15.51	4.78	28.56	3.14	40.27	7.74	20.00
9747	9.06	2.42	3.13	49.66	35.12	0.61	
6002	10.75	10.00*	10.50	43.77	20.18	4.80	24.00
7625	7.29	5.96	22.94	13.72	17.72	32.37	22.00
4829	----	----	34.50	----	----	----	34.10
4592	6.84	0.90	2.56	64.06	25.36	0.28	
4716	7.08	11.68	14.75	9.92	49.60	6.97	
4682	6.95	11.79	14.44	9.58	50.76	6.48	
6112	8.95	12.98	18.00	6.47	44.33	9.27	16.00
6111	8.95	2.67	11.44	1.93	73.02	1.99	12.00
4591	8.78	5.55	11.50	13.55	58.53	2.09	
7310	8.81	4.40	13.12	4.15	58.98	10.54	25.00
4612	9.71	----	11.75	----	----	6.58	17.00

* Sand 6.20 per cent.

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
	MISCELLANEOUS MIXED FEEDS.		
7600	Provender	W. O. Goodsell, Bristol	Bristol, W. O. Goodsell
7687	“	Ives & Pierce, Canaan	Canaan, Ives & Pierce
7454	“	Smith, Northam & Co., Hartford	Centerbrook, W. J. Prann
7540	“	E. F. Strong, Colchester	Colchester, E. F. Strong
7527	“	Quinnebaug Mill, Daniel- son	Danielson, Quinnebaug Store
7618	“	W. J. Cox, East Hartford	East Hartford, W. J. Cox
7409	“	Hawkins & Forbes, East Haven	East Haven, Hawkins & Forbes
7421	“	Morse & Landon, Guil- ford	Guilford, Morse & Langdon
7430	“	Ira W. Beers, Hamden	Hamden, Ira W. Beers
7587	“	Hugh Reynolds, New Britain	New Britain, Hugh Reynolds
7472	“	E. W. Bailey & Co., Montpelier, Vt.	New London, E. H. Caulkins
7624	“	Rockville Milling Co., Rockville	Rockville, Rockville Milling Co.
7698	“	E. H. Talcott, Torrington	Torrington, E. H. Talcott
7435	“	E. E. Hall, Wallingford	Wallingford, E. E. Hall
7706	“	G. L. Dickinson, Water- bury	Waterbury, G. L. Dickinson
7702	“	C. W. & T. F. Atwood, Watertown	Watertown, C. W. & T. F. Atwood
7689	“	Balch & Platt, Winsted	Winsted, Balch & Platt
			Average of above 17 analyses
			Average digestible
7590	Victor Corn & Oat Feed	American Cereal Co., Chicago, Ill.	Bristol, G. W. Eaton
7305	“ “	American Cereal Co., Chicago, Ill.	New Haven, Abner Hendee
7461	“ “	American Cereal Co., Chicago, Ill.	Saybrook, J. H. Day, Jr.
7433	“ “	American Cereal Co., Chicago, Ill.	Wallingford, E. E. Hall
			Guaranty
			Average of above 4 analyses
			Average digestible
7681	Vim Oat Feed	American Cereal Co., Chicago, Ill.	New Milford, Ackley, Hatch & Marsh
			Guaranty
			Average digestible
7669	Boss Corn and Oat Feed	Great Western Cereal Co., Chicago, Ill.	Danbury, F. C. Benjamin & Co.
7619	“ “ “ “	Great Western Cereal Co., Chicago, Ill.	Manchester, Manchester Elev. Co.

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7600	12.66	1.78	10.44	3.89	66.80	4.43	\$31.00
7687	12.04	2.14	11.12	5.65	64.92	4.13	28.00
7454	12.72	2.03	10.00	4.50	66.46	4.29	32.00
7540	12.48	1.61	10.06	2.60	69.04	4.21	28.00
7527	11.95	1.69	10.44	3.70	67.99	4.23	30.00
7618	12.21	1.92	10.81	4.29	66.52	4.25	32.00
7409	13.07	1.58	10.50	3.35	67.26	4.24	31.00
7421	13.02	1.76	10.50	3.47	66.90	4.35	32.00
7430	13.89	2.03	10.94	3.86	65.01	4.27	29.00
7587	12.87	2.35	11.19	4.53	64.94	4.12	30.00
7472	12.87	1.94	10.31	4.38	66.45	4.05	32.00
7624	11.97	1.54	10.00	2.93	69.77	3.79	----
7698	11.77	1.95	10.19	4.80	67.11	4.18	30.00
7435	13.40	1.92	10.12	3.82	67.70	3.04	32.00
7706	10.82	1.92	11.00	3.77	68.13	4.36	30.00
7702	13.03	1.82	10.12	3.57	67.27	4.19	28.00
7689	11.11	1.96	10.25	4.06	68.55	4.07	30.00
	12.47	1.88	10.47	3.95	67.10	4.13	30.30
	----	----	7.43	1.89	55.69	3.59	
7590	9.60	3.42	9.06	11.84	61.69	4.39	26.00
7305	10.53	3.55	9.06	11.56	61.68	3.62	24.00
7461	10.11	3.79	9.37	10.92	61.47	4.34	21.00
7433	10.83	4.12	9.37	11.20	60.44	4.04	24.00
	----	----	9.0	----	----	4.0	
	10.27	3.72	9.21	11.38	61.33	4.09	23.75
	----	----	6.54	5.46	50.90	3.56	
7681	8.15	6.06	8.25	23.27	51.17	3.10	18.00
	----	----	6.3	----	----	2.4	
	----	----	5.88	11.17	42.47	2.69	
7669	9.75	5.47	8.12	14.00	59.96	2.70	24.00
7619	9.67	6.56	7.87	13.46	59.89	2.55	25.00

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
7311	Boss Corn and Oat Feed	Great Western Cereal Co., Chicago, Ill.	New Haven, R. G. Davis..... Guaranty
			Average of above 3 analyses... Average digestible
7659	Excelsior Corn and Oat Feed	Great Western Cereal Co., Chicago, Ill.	So. Norwalk, M. T. Hatch..... Guaranty
7582	De-Fi Corn and Oat Feed	Ellsworth & Co., Buffalo, N. Y.	New Britain, C. W. Lines..... Guaranty
7626	Corn and Oat Feed	Diamond Mills, Buffalo, N. Y.	Suffield, Arthur Sikes
	CORN, OATS AND BARLEY.		
7656	Schumacher's Stock Feed	American Cereal Co., Chicago, Ill.	Bridgeport, Berkshire Mills Co.
7592	" " "	American Cereal Co., Chicago, Ill.	Bristol, G. W. Eaton
7438	" " "	American Cereal Co., Chicago, Ill.	Meriden, A. H. Cashen
7413	" " "	American Cereal Co., Chicago, Ill.	New Haven, J. T. Benham Est.
7483	" " "	American Cereal Co., Chicago, Ill.	Yantic, A. R. Manning & Co.. Guaranty
			Average of above 5 analyses...
	PROPRIETARY HORSE FEEDS.		
7597	H-O Horse Feed	H-O Co., Buffalo, N. Y.	Bristol, W. O. Goodsell
7467	" "	" " "	Groton, Groton Grain Co.
7303	" "	" " "	New Haven, Abner Hendee ... Guaranty
			Average of above 3 analyses... Digestible
7629	Horse Feed	Buffalo Cereal Co., Buffalo, N. Y.	Suffield, Arthur Sikes
			Guaranty
			Digestible
	PROPRIETARY POULTRY FEEDS.		
7469	H-O Poultry Feed	H-O Co., Buffalo, N. Y.	Groton, Groton Grain Co.
7583	" "	" " "	New Britain, C. W. Lines
7655	" "	" " "	Norwalk, Holmes, Keeler & Selleck Co.
			Average of above 3 analyses... Guaranty

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7311	9.78	5.60	8.06	14.90	58.67	2.99	\$21.00
	----	----	7.8	----	----	4.2	
	9.73	5.88	8.01	14.12	59.51	2.75	
			5.69	6.78	49.39	2.39	
7659	9.90	5.18	9.37	12.40	58.62	4.53	20.00
	----	----	8.2	----	----	4.6	
7582	9.35	4.14	9.25	15.30	58.77	3.19	22.00
	----	----	8.3	----	----	3.0	
7626	10.27	2.90	8.81	10.43	62.05	5.54	26.00
	----	----	9.4	----	----	4.8	
7656	9.67	3.99	12.50	10.64	58.10	5.10	26.00
7592	9.47	4.09	12.50	12.71	56.03	5.20	30.00
7438	10.11	4.66	13.12	11.90	55.15	5.06	27.50
7413	10.65	3.88	12.12	10.06	58.19	5.10	30.00
7483	9.96	4.28	13.06	10.80	56.69	5.21	28.00
	----	----	13.0	----	----	5.0	
	9.97	4.18	12.66	11.22	56.84	5.13	28.30
7597	9.49	3.13	12.62	9.98	59.64	5.14	29.00
7467	10.20	3.55	12.87	10.08	58.71	4.59	30.00
7303	10.37	3.49	12.81	9.71	58.94	4.68	29.00
	----	----	12.0	----	----	4.5	
	10.02	3.39	12.77	9.92	59.10	4.80	29.25
	----	----	9.45	3.47	46.68	4.03	
7629	9.57	3.30	12.75	10.10	59.50	4.78	29.00
	----	----	12.5	----	----	4.5	
	----	----	9.44	3.54	47.00	4.02	
7469	10.57	2.92	17.62	4.99	58.56	5.34	35.00
7583	9.55	3.47	16.94	4.80	60.08	5.16	35.00
7655	9.76	3.25	17.19	4.53	60.38	4.89	37.00
	9.96	3.21	17.25	4.77	59.68	5.13	
	----	----	17.0	----	----	5.5	

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
7595	H-O Scratching Feed ----	H-O Co., Buffalo, N. Y.	Bristol, W. O. Goodsell ----- Guaranty -----
7539	Success Poultry Feed ---	Case & Co., Colchester	Colchester, E. F. Strong -----
7448	American Poultry Food	American Cereal Co., Chicago, Ill.	Southington, Southington Lum- ber and Feed Co.
			Guaranty -----
	BONE AND MEAT MEAL.		
7523	Meat Meal	Rogers Mfg. Co., Rockfall	Danielson, The Young Bros. Co. Guaranty -----
7547	Beef Scrap	C. M. Shay, Navy Yard, Conn.	East Hampton, R. H. Hall ----
7468	" "	Am. Agr. Chem. Co., New York	Groton, Groton Grain Co. Guaranty -----
7446	Bone and Meat Meal	McCoy & Best, Peekskill, N. Y.	Southington, Southington Lum- ber and Feed Co.
			Guaranty -----
7643	Meat Meal	The Armour Co., Chicago, Ill.	Thompsonville, H. K. Brainard
7491	Swift's Lowell Bone and Meat Meal	Lowell Fertilizer Co., Lowell, Mass.	Yantic, A. R. Manning & Co. ... Guaranty -----
	PROPRIETARY DAIRY AND STOCK FEEDS.		
7620	Quaker Dairy Feed ----	American Cereal Co., Chicago, Ill.	Manchester, Manchester Elev. Co.
7666	" "	American Cereal Co., Chicago, Ill.	New Canaan, C. H. Fairty ----
7312	" "	American Cereal Co., Chicago, Ill.	New Haven, R. G. Davis
			Guaranty -----
			Average of above 3 analyses ...
			Average digestible -----
7440	H-O Dairy Feed	H-O Co., Buffalo, N. Y.	Meriden, Meriden Grain & Feed Co.
7481	" "	" " "	New London, Beebe & Bragaw Guaranty -----
			Average of above 2 analyses ...
			Average digestible -----

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7595	12.18 ----	2.26 ----	11.87 12.0	2.69 ----	67.30 -----	3.70 3.0	\$38.00
7539	12.09	3.98	13.37	4.44	61.85	4.27	30.00
7448	11.73 ----	2.94 ----	14.56 14.0	4.78 ----	59.87 ----	6.12 4.50	32.00
7523	6.94 ----	46.98 ----	28.31 40.0	---- ----	---- ----	14.28 15.0	38.00
7547	14.35	21.50	46.87	----	----	13.66	50.00
7468	8.35 ----	26.36 ----	49.00 50.0	---- ----	---- ----	13.86 16.0	45.00
7446	5.99 ----	40.26 ----	36.75 41.4	---- ----	---- ----	13.94 19.8	34.00
7643	7.43	4.67	66.25	----	----	14.97	40.00
7491	10.62 ----	27.50 ----	50.75 50.0	---- ----	---- ----	10.07 10.0	40.00
7620	8.89	5.21	14.81	14.95	52.42	3.72	21.00
7666	8.46	5.30	14.44	15.76	52.51	3.53	21.00
7312	9.29 ---- 8.88 ----	4.46 ---- 4.99 ----	14.25 14.0 14.50 11.31	15.88 ---- 15.53 6.37	52.65 ---- 52.53 36.77	3.47 3.5 3.57 3.07	21.00 21.00
7440	10.08	3.98	18.25	12.43	50.64	4.62	30.00
7481	9.42 ---- 9.75 ----	4.02 ---- 4.00 ----	17.19 18.0 17.72 13.82	14.05 ---- 13.24 5.43	50.66 ---- 50.65 35.45	4.66 4.5 4.64 3.99	30.00

TABLE IV.—*Continued.* ANALYSES OF COMMERCIAL FEEDS.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
7442	The Great Western Dairy Feed	Great Western Cereal Co., Chicago, Ill.	Meriden, S. A. Billings.....
7569	The Great Western Dairy Feed	Great Western Cereal Co., Chicago, Ill.	Middletown, Meech & Stoddard Guaranty
			Average of above 2 analyses...
7563	Daisy Dairy Feed.....	Great Western Cereal Co., Chicago, Ill.	Willimantic, H. A. Bugbee.... Guaranty
7670	Lenox Stock Food.....	Strong & Lefferts Co., New York	Danbury, F. C. Benjamin & Co.
7705	" "	Strong & Lefferts Co., New York	Waterbury, D. L. Dickinson... Guaranty
			Average of above 2 analyses...
7604	Chester Stock Feed.....	Chester Mills, New York	Hartford, Daniels Mills Co.... Guaranty
7630	Empire State Cow Feed ..	The Diamond Mill, Buffalo, N. Y.	Suffield, Arthur Sikes
			Guaranty
7628	Creamery Feed	Buffalo Cereal Co., Buffalo, N. Y.	Suffield, Arthur Sikes
7627	Dairy Feed.....	Buffalo Cereal Co., Buffalo, N. Y.	Suffield, Arthur Sikes
7691	Blatchford's Calf Meal ..	The Bardwell Mills, Waukegan, Ill.	Winsted, Balch & Platt..... Guaranty

SAMPLED IN 1902.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-free Extract. (Starch, gum, etc.)	Ether Extract.	
7442	9.60	7.06	11.81	20.20	48.98	2.35	\$22.00
7569	8.09	6.00	9.37	21.47	52.00	3.07	22.00
	-----	-----	12.2	-----	-----	3.2	
	8.85	6.53	10.59	20.83	50.49	2.71	
7563	9.01	7.82	9.56	24.86	46.67	2.08	20.00
	-----	-----	12.2	-----	-----	3.2	
7670	11.06	2.49	10.37	6.72	64.52	4.84	27.00
7705	11.01	2.88	10.12	7.75	63.74	4.50	24.00
	-----	-----	10.4	-----	-----	3.3	
	11.03	2.68	10.25	7.23	64.14	4.67	
7604	10.82	2.72	12.87	9.29	60.11	4.19	26.00
	-----	-----	9.0	-----	-----	3.5	
7630	9.87	8.71	14.25	15.75	47.74	3.68	20.00
	-----	-----	14.9	-----	-----	3.5	
7628	9.22	3.90	20.37	11.36	50.72	4.43	26.00
7627	6.28	3.70	14.31	13.84	57.47	4.40	26.00
7691	11.41	4.84	25.53	4.61	49.40	4.21	70.00
	-----	-----	26.0	-----	-----	5.0	

EXPLANATIONS OF ANALYSES OF FEEDING STUFFS.

An analysis gives the percentage amounts of Water, Ash, Protein, Fiber, Nitrogen-free Extract, and Fat.

Percentage Amount is the amount in 100. If the protein in a feed is 17.5 per cent., every 100 pounds of that feed contains 17.5 pounds of protein; and since a ton is twenty hundred pounds, a ton of the feed will contain twenty times 17.5, or 350 pounds of protein.

Water. However dry a feeding stuff may appear to be, it always contains a considerable and variable quantity of water which cannot be seen or felt, but which can be driven out by heat. The amount of water thus present in feeding stuffs is constantly changing with the temperature and dryness of the air about them, and accordingly no close comparison of different foods is possible unless the proportions of water they contain are known and comparison is made on perfectly dry or water-free substance.

Ash is what is left when the combustible part of a feeding stuff is burned away by heating to faint redness in a current of air and besides a little charcoal and sand, which are accidental impurities, consists chiefly of lime, magnesia, potash and soda, combined with chlorine and carbonic, sulphuric and phosphoric acids.

Protein is a general term which includes all those nitrogenous materials of a concentrated feeding stuff which bears a general resemblance in composition and properties to egg albumin (white of egg), flesh fibrin (lean meat), and milk casein (curd). These nitrogenous materials are the most costly ingredients of feeds.

Nitrogen-free Extract, sometimes called *Carbohydrates*, includes starch, gum, sugar and pectin bodies. They are readily extracted from the feeding stuff by water and dilute acid.

Fiber is the essential constituent of the walls of vegetable cells and is seen in a nearly pure state in cotton fiber or paper pulp. It is the most insoluble part of the vegetable substance and of quite subordinate value in the ration.

Ether Extract includes fat oil, solid fat, wax, chlorophyl (the green coloring matter of plants), and other coloring matters, in brief everything which can be extracted from the perfectly dry feeding stuff by absolute ether.

Regarding the uses of the above-named parts of feeds :

Water and ash need not be considered, for while indispensable to stock both are abundantly supplied in other ways than in bought feed.

Protein may easily be made over by the animal into its own substance, i. e., into muscles, tendons and the various working tissues and membranes, because these necessary parts of the animal machine are themselves made up of the same kind of materials, or, chemically speaking, have the same composition as the protein bodies.

Fiber and the nitrogen-free extract, on the other hand, probably cannot serve at all for building up the muscles and other parts of the growing animal and cannot restore the waste and wear of those parts of mature animals, because they are of a very different nature. They contain no nitrogen, an element which enters into all the animal tissues (proteins) to the extent of some sixteen per cent. of their dry matter.

Fiber and the nitrogen-free extract cannot restore the worn-out muscles or membranes of the animal any more than coal can be made to renew the used-up packing, bolts, valves, flues and gearing of a steam-engine. Proteins are to the ox or the man what brass and iron are to the machine, the materials of construction and repair.

Fat, fiber and nitrogen-free extract are, furthermore, to the animal very much what coal and fuel are to the steam-engine. Their consumption generates the power which runs the mechanism. Their burning (oxidation) in the blood of animals produces the results of life just as the combustion of coal in the fire-place of the steam-engine produces the motion and power of that machine. For this combustion in the system, digestible fat has more than twice the value of digestible nitrogen-free extract.

There is, however, this difference between the engine and the animal: the former may be stopped for repairs, the latter may run at a lower rate, but if it be stopped it cannot resume work. Hence the repairs of the animal must go on simultaneously with its wastes. Therefore, the material of which it is built must admit of constant replacement, and the dust and shreds of its wear and tear must admit of escape without impeding action. The animal body is as if an engine were fed not only with coal and water, but with iron, brass and all the

materials for its repair, and also is as if the engine consumed its own worn-out parts, voiding them as ashes or as gas and smoke. Proteids or the blood- and tissue-formers are thus consumed in the animal, as well as the fat, fiber and nitrogen-free extract or fuel proper. The fact that proteids admit of consumption implies that when the proper fuel is insufficient, they may themselves serve as fuel. Such is the case, in fact. But, nevertheless, the two classes of substances have distinct offices in animal nutrition, and experience has demonstrated that for each special case of animal nutrition a special ratio of digestible proteids to digestible fat, fiber and nitrogen-free extract is the best and most economical, and, within certain limits, is necessary.

The Uses of Analyses of Feeding Stuffs.

These uses are several. First, by an analysis compared with the average of others, any buyer of a feed can see whether it is of the usual quality. Thus on page 27, the analysis of cotton seed meal, No. 7660, compared with the average of eight analyses given on the same page, shows that its quality is below average as regards protein, the most valuable ingredient.

Secondly, by an analysis compared with the manufacturer's guaranty any buyer can see whether in composition the feed meets what is claimed for it. Thus on page 57 the analysis of sample No. 7569 shows that the feed contained about 3 per cent. less of protein than it was stated by the manufacturer to contain.

Thirdly, an analysis often shows clearly whether or not the feed is adulterated and may indicate also the form of adulteration. This use is fully illustrated by the discussion of adulterated wheat feeds on pages 8 to 10 of this bulletin.

Fourthly, comparison of analyses of a number of kinds of feed with their prices will greatly help in deciding whether any one of them is worth to the feeder what is asked for it. Too often the prices of feeds bear no relation to their real feeding value.

Lastly, the chief use of these tables by feeders should be as a guide to the skillful compounding of rations for farm animals. How this is done cannot be briefly explained within the limits of a bulletin. A knowledge of the principles of cattle feeding is essential, which should be gathered by studying books which treat of the principles of cattle-feeding and of the art of compounding rations.





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